PHD

Incumbent Competition, Decision-Making, and Policy Choice

Go, Anne Marie

Award date:
2019

Awarding institution:
University of Bath

Incumbent Competition, Decision-Making, and Policy Choice

Anne Marie Go

A thesis presented for the degree of
Doctor of Philosophy

University of Bath

Department of Economics

May 2019

Contents

I Acknowledgments

I would like to begin with expressing my sincere gratitude to my supervisors, Dr. Javier Rivas and Dr. Nikolaos Kokonas. I would not be where I am now without your guidance and your continuous support. Thank you for all the insight, the advise, and for always pushing me to be better. You are the best supervisors any student could ask for.

I would also like to thank Dr. Maik Schneider and Dr. Santiago Sanchez-Pages for their valuable feedback on the thesis. My sincere thanks also goes to the people who have made my journey in Bath most memorable, Alaa and Onyinye. To my friends Stefanni, Miriam, Martyn, Jo, Sophia, Khurram, Diana, Rena, Elise and many many more, thank you for being my rock in this Ph.D. journey - I can only be so lucky to have people as wonderful as you are in my life.

Most importantly, I would like to thank my family for all their love and support. To my mom and dad, Susan and Andrew, I have only gotten this far because you have always believed in me. I hope I have made you proud. To my sisters, Anj, Xav, Shine, and Daphne, your unwavering support has kept me going in the hardest of times, thank you for everything.

Anne Marie Go
May 2019

II Thesis Abstract

In the first paper, two politicians decide whether to follow what they believe the public wants or choose the option that secures their private gain. The public only rewards a politician when a policy is implemented, or an action that coincides with the public decision is chosen. Politicians with good decision-making abilities, under sufficiently high policy rewards and moderate private benefit, take the action that generates a public benefit, implementing the popular policy. Politicians with very poor decision-making abilities, give sufficiently high policy rewards, choose to implement a policy regardless of what the public want. Only popular policies are passed for salient issues.

In the second paper, two incumbents each decide on an action to maximize their popularity. The choices are made in consideration of their beliefs on the popular and socially optimal choices. The paper looks at the types of policies passed for both salient and non-salient issues given different levels of clarity on public opinion. For salient issues, a divided public is better than a united but ill-informed one. For non-salient issues, policies are always passed when public opinion is clear, while politicians diverge strategically under low policy payoffs when public opinion is unclear.

The third paper considers a model of lobbying where two opposing lobbyists vye for the support of a legislator with uncertain preferences. When uncertainty on legislator preference is low, lobbyists bid aggressively. When uncertainty is high, lobbyists bid conservatively. When the degree of uncertainty is moderate, we find asymmetric equilibria where one lobbyist chooses to either bid conservatively or aggressively, and the other just enough to ensure that the average bid is equal to the legislator's integrity threshold.

III Introductory Remarks

Democracy has thrived as one of the most widespread institutions in governance. In representative democracies in particular, the public exercises its will through elected politicians. Politicians represent public interest directly or as trustees. Politicians, as direct representatives, are expected to follow the will of the people. Politicians perceived positively benefit through popularity and increased election prospects. As trustees, politicians are expected to make decisions that are in the public's best interest. Although these two responsibilities may intersect, divergence in outcomes provides politicians with opportunities to increase their utility outside the permitted bounds of their office.

Issues arise when politicians have incentives to deviate from their mandate to serve the public. The political agency model allows us to explore how politicians, as rational agents, maximize their gains. Contracts within political institutions does not delineate the responsibilities of its agents as clearly as private agenciers. The lack of defined guidelines complicates the establishment of an effective political agency model. While the clear setting of expectations and payoffs allows for effective monitoring in the traditional principal-agent model, the lack of delineation in rewards and punishments provides opportunities for politicians to misbehave.

Understanding how politicians behave is critical in ensuring that the policies passed are beneficial to the public. Policies are enacted by the decisions of the incumbents. Politicians, however, have avenues outside their official designations as representatives to benefit from their position in office. Corruption and rent-seeking has been established empirically and explored substantially in theory. Rent-seeking can come in the form of side payments from government projects or lobbyist contributions for policy support. Politicians can also improve approval and perception through pandering. Pandering politicians follow popular decisions that may not benefit the public. When politicians pander, the decisions they make aim to maximize public approval without regard to welfare. Given the frictions between the roles politicians are expected to perform in office, pandering can prove to be beneficial if the costs are sufficiently low. I explore the process of policy making abstracting away from voter preferences, and focusing on interactions of competing politicians and lobbyists.

The first paper touches on the issue of corruption and rent-seeking in political agency. The paper looks at incumbent politicians who compete under a model of relative popularity with an option to pursue a private benefit. In this competitive scenario, the decision of the opposing party and the characteristics that influence this decision will have an effect on the payoffs, and subsequently, the decisions made by the politicians. Policies are only enforced under unanimity. Politicians seek to maximize their gains in office by increasing popularity perceptions. The model of relative popularity is formally introduced in this paper. In this environment, the public knows what is best for them. There is however an incentive to be corrupt and deviate towards a private benefit. The policies enforced depend not only the size of the private benefit but also the type of issue in consideration. The model allows us to look at how policies are implemented during a term and how the game unfolds on the level of competing politicians, given their own private interests, the public's response, and their decision-making abilities.

The second paper focuses on the issue of pandering. Using the same model of relative popularity, I explore an environment where popular and socially optimal choices may differ. The public do not know what is best for them. Politicians have access to expert opinion and have a better idea of what thesocially optimal choice is. Politicians may not always pander when they can. The paper explores when and why pandering occurs in a binary setting. As issues discussed in media platforms are often broken down in two polarized opinions, there is an additional benefit in understanding how politicians position themselves to maximize public opinion.

The third paper shifts focus from competing politicians to lobbyists. In this paper, we approach the lobbying process as one where cash-for-favour exchanges occur as a means to obtain access to legislators. The model uses a simultaneous lobbying structure and takes into account the degree of uncertainty on a non-strategic legislator's preference, the legislator's level of integrity, and the perceived advantages each lobbyist may have on their respective policies The paper contributes to the understanding of shadow lobbying. By analysing how lobbying proceeds, the results provides insights for the development more effective lobbying regulations and provide constituents with an avenue to influence policy outcomes before issues hit legislature floors.

The results overall enrich our understanding of how policies are made and politician support is gained. Outcomes can be useful in implementing policies that improve public welfare.

IV

Paper 1:
Incumbent Competition and Private Agenda

Statement of Authorship

This declaration concerns the article entitled:									
Incumbent Competition and Private Agenda									
Publication status (tick one)									
draft manuscript	x	**Submitted**		**In review**		**Accepted**		**Published**	
Publication details (reference)									
Candidate's contribution to the paper (detailed, and also given as a percentage).	The candidate contributed to/ considerably contributed to/predominantly executed the… Formulation of ideas: 100% Design of methodology: 100% ~~Experimental work:~~ Presentation of data in journal format: 100%								
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.								
Signed	Anne Marie Go					**Date**	07/05/2019		

Incumbent Competition and Private Agenda

Anne Marie Go *

Abstract

Consider two politicians who decide whether to follow what they believe the electorate wants or choose the option that secures their private gain. Policies are implemented when the politicians reach a unanimous decision. The electorate only rewards a politician when a policy is implemented, or when the politician is the only one whose action coincides with the popular decision. I find that if the politicians have good decision-making abilities, sufficiently high payoffs in policy implementation given moderate private agenda payoffs pushes the politicians to implement the popular policy. For very poor decision-making abilities, at sufficiently high policy rewards, I find that they vote for the same action to implement a policy regardless of what the electorate want - converging to a decision that neither provides them with a private benefit nor follows exactly the popular decision. For issues of very high relevance to the electorate, only popular policies are passed.

JEL Classication: D72, D80

*Department of Economics, University of Bath; Email: a.go@bath.ac.uk

1 Introduction

Incumbent politicians decide on policies and laws in representative democracies. Despite being a ubiquitous feature of politics, the consequences of the decisions of the politicians are still unclear. The literature on politician responsiveness and public opinion is divided. While some conclude that public opinion is significant in policy (Page and Shapiro, 1983; Erikson et al., 1989; Burstein, 2003; Hagemann et al., 2017), others find that the influence is not as clear cut (Manza and Cook, 2002; Page, 2002; Canes-Wrone and Shotts, 2004; Burstein, 2006; Alexandrova et al., 2016). The literature on politician responsiveness and public opinion is divided. We attempt to explain the disparity in the expectations of political accountability and the impact of public opinion on policy through an alternative model of popularity for competing politicians.

This paper explores a setting wherein two competing politicians take a decision on an issue. The decision is a trade-off between what she believes the electorate wants and the decision in which she stands to receive a private benefit. Both politicians receive a signal on the popular choice. We introduce a model of relative popularity, where the performance of the incumbent is not measured independently, instead it is measured in conjunction with the performance of her opponent. Depending on the policy rewards, the level of private benefit, and the decision-making ability of the politicians, a coordination or anti-coordination game is played.

The results show how a politician's private interests and the electorate control, in the form of popularity payoffs, affect policy outcomes. Large private benefits are found to increase the propensity of politicians to follow the private option and become dishonest. In terms of electorate controls, the results indicate that increasing the payoff for popular policy implementation makes politicians more likely to follow the popular policy for both salient and non-salient issues. However, an increased reward in policy implementation when issues are non-salient provides incentives for politicians to collude and decide on one decision without regard to the popular choice. Overall, the electorate is found to be better off when politicians coordinate.

The paper focuses on an environment where politicians can be held directly accountable for governmental outcomes. Popularity is used in place of the threat of nonre-election in this model. To the best of my knowledge, the paper is the first to explore politician accountability under a relative popularity framework. The static nature of the game provides an alternative perspective from which one can view last period performance. The analysis with respect to decision-making ability and rent provides an additional perspective on the selection of policy makers. As the politicians are already in office, the results look at how different levels of public incentives affect both the implementation of a policy and the type of policy implemented. The results also provide information under what conditions policies are implemented. More importantly, the model provides insights on how incumbents interact and if they can be induced to make good decisions regardless of their abilities.

The model uses popularity as an incentive for politicians to follow public opinion, instead of the threat of non-reelection used widely in existing studies on political accountability (Barro, 1973; Ferejohn, 1986; Wattenberg, 2004; Rivas, 2013; Myatt, 2017). The notion of popularity captures gains during and after holding office. It is another way to exercise accountability through feedback, encompassing public perception on performance in office, similar to retrospective voting. Evidence on retrospective voting at the state and national levels has been mixed(Kenski, 1977; Abramowitz et al., 1988; Evans and Andersen, 2006), but may be largely due to the focus on the effects of economic outcomes and inflation rates Kenski (1977); Abramowitz et al. (1988); Evans and Andersen (2006). However, as delegate representatives, the politicians in the model can be made accountable for their actions. We focus on direct politician impact on policy outcomes in the paper. As delegate representatives, the politicians in the model can be made accountable for their actions. Tsai (2007) and Berry and Howell (2007) find increased responsiveness from office holders when direct accountability is established. A study by Cleary (2007) in 2400 municipalities in Mexico from 1989 to 2000 showed that the quality and responsiveness of the municipal government depended more on the degree of citizen engagement rather than a threat of non-reelection.

The model assumes that the politicians are expected by the electorate to act as delegate representatives. We follow the definition of delegate representation by McCrone and Kuklinski (1979), where delegate representatives' reflect the preferences of the constituents. For voters to hold incumbents accountable for their past performance, it has to be measured in areas that incumbents oversee directly (Berry and Howell, 2007; Malhotra and Margalit, 2014). By limiting the role of the politician to a delegate, the actions of politicians faced with uncertainty on public sentiment and outside income sources can be better studied. Existing literature have shown that voters do respond to the actions of politicians in office. Healy and Malhotra (2010) used a tornado incident to study how politician perceptions are changed. The findings showed that voters do not blame incumbents for the natural events, instead reward and punish politicians on how the incident is handled. Besley and Burgess (2002) showed that the effects of public opinion in government responsiveness increases as media reach increases. The influence of public opinion on policy has also been studied empirically, with the impact changing depending on issue salience and possible competition (King, 2001; Wattenberg, 2004; Myatt, 2017)

The use of popularity also allows us to account for the gains a politician may have upon leaving the seat of power. Politicians shift from having *de jure* to *de facto* power (Acemoglu et al., 2004). It is not unusual to observe a politician go through the "revolving door of politics" (Fisman, 2001; Blanes i Vidal et al., 2012; Goldman et al., 2013; Cain and Drutman, 2014; Luechinger and Moser, 2014). The connections politicians make in office provide them with excellent opportunities post-incumbency as private firms tend to benefit from high degrees of political-connectedness (Khwaja and Mian, 2005; Faccio, 2006; Ferguson and Voth, 2008). Prominent figures including previous prime minister of the UK Tony Blair has faced criticism in his consultancy work that involved contact with foreign leaders (Thompson, 2016). If one is perceived popular, *de facto* power is stronger, providing increased access to both information and resources.

Public response is modeled through popularity-related payoffs for both salient and non-salient issues. We consider the relative performance evaluation theory that suggests contract efficiency can be improved by incorporating the performance of comparable agents (Antle and Smith, 1986). I argue that relative performance evaluations can be observed commonly in politics. The "Keeping up with the Joneses" perspective has been used across different fields of study in economics (Gali, 1994; Easterlin, 1995; Ljungqvist and Uhlig, 2000; Carlsson et al., 2007). We take the underlying process - wherein an individual judges himself according to his relative performance against his peers, and use it in the electorate's evaluation of the performance of competing incumbents. Instead of measuring the performance of politicians independently, a voter looks at a politician's performance in relation to the competing politician's performance. More specifically, good politician performance is highlighted when the competing politician performs poorly. Conversely, bad performance is highlighted when the performance of the competing politician is good. When the performance of both politicians are equally bad, or good, the perception of ineffectiveness, or effectiveness, is downplayed.

We expect different outcomes depending on issue salience. When an issue is salient, a politician who deviates from the popular choice, regardless of opponent action, is viewed ineffective. However, when an issue is non-salient, the public does not care too much about the policy implemented, and only notices that a politician is ineffective if the opponent chooses the popular action. The behaviour of politicians for non-salient issues can be viewed in particular as an anti-coordination game. Under non-salient issues, a politician who deviates from the popular choice still obtains popularity payoff from policy implementation if the opponent also deviates from the popular choice.

Outside the gains from being popular, politicians can also receive payoffs directly from the private sector. Although the negative impact on high private agenda or rent on politician attitudes in office have been well documented (Krueger, 1974; Ferejohn, 1986; Rivas, 2013; Di Tella and Franceschelli, 2011), corrupt politicians still manage to secure re-election in more nascent democracies. In the Philippines, an ex-senator acquitted of plunder and ordered by the courts to return approximately USD 2.4 million to the national treasury is a front runner in the 2019 senatorial elections (Buan, 2019; PulseAsia, 2019). In Brasil, despite the Mensalao scandal, ex-president Lula da Silva still left office with huge approval ratings (BBC, 2012). The reason may be due to the fact that the impact of corruption extends beyond the offending party. Chong et al. (2015) found that corruption decreases voter turnout in general and drives down the support for both the incumbent and challenging party. When all politicians are perceived corrupt, the electorate overlooks information on corruption and looks at other indicators to assess quality(Svolik, 2013; Pavo, 2018). This is reflected in the model, the electorate only takes into account how the actions of the politician align with the popular choice and politicians are not punished for taking the private benefit.

The results show how a politician's private interests and the electorate control, in the form of popularity payoffs, affect policy outcomes. Large private benefits are found to increase the propensity of politicians to follow the private option and become dishonest. In terms of electorate controls, the results indicate that increasing the payoff for popular policy implementation makes politicians more likely to follow the popular policy for both salient and non-salient issues. Our results corroborate the findings of Wattenberg (2004), Burstein (2006), and Myatt (2017) where the impact of public opinion on policy is affected by issue salience. The politicians are more likely to implement popular policies when issues are salient. However, an increased reward in policy implementation when issues are non-salient provides incentives for politicians to collude and decide on one decision without regard to the popular choice. The paper finds that ultimately, better decision-making ability in politicians makes it more likely for politicians to ignore the private benefit and follow the preferences of the electorate. Better decision-makers have more incentive to be honest as there is less risk in getting the popular choice correctly. Empirical results in India show that education increases the chances of selection to public office and makes politicians less likely to be opportunistic in office (Besley et al., 2005). Overall, the electorate is found to be better off when politicians coordinate.

The model can be used in settings where the actions of politicians can be directly attributed to outcomes: policy implementation or the passing of legislation for legislators, and the policy positioning of a coalition majority ruling party - such as the Conservative Party and the Democratic Union Party (DUP) in the United Kingdom and Germanys Social Democratic party (SPD), Christian Social Union of Bavaria (CSU) and the conservative Christian Democratic Union (CDU). Increasing educational requirements in politicians may lead to a more responsive government. Furthermore, reducing uncertainty on popular choice, particulary in salient issues, through more active public participation can push for the implementation of policies that benefit the public.

The rest of the paper covers the model in section 2, politician strategies in section 3, the analysis of outcomes for both salient and non-salient issues in section 4, and concluding remarks in section 5.

2 The Model

Consider a homogenous electorate. The state of nature, $\omega \in \Omega = \{0, 1\}$, represents the popular decision, which is perceived to be optimal by the electorate. Both states are equally likely.

Two incumbent politicians $i \in \{1, 2\}$ have to decide on a policy. The electorate knows the state of nature, but the politicians do not. Instead, politician i receives a signal $\theta_i \in \{0, 1\}$ on the state of nature, with quality q. The quality of the signal, $q \in [1/2, 1]$, represents the decision-making ability of the politician, and can be characterized as follows.

$$P(\theta_i = \omega) = q$$

Bad decision makers have signal qualities close to $1/2$ — a signal of $q = 1/2$ has the accuracy of a random guess. The politicians have the same decision-making abilities and are both aware of the quality of the signals received.

Politicians decide on an action, $a_i \in A_i = \{0, 1\}$ simultaneously. A policy is implemented when both politicians choose the same action. Politicians enjoy their popularity among the electorate. The popularity of the incumbents depend on how their actions align with the popular choice. The popularity payoff is given by,

$$\pi_{Pi} = \begin{cases} 1 & \text{if } a_i = \omega \text{ and } a_{-i} \neq \omega, \\ T & \text{if } a_i = \omega \text{ and } a_{-i} = \omega, \\ B & \text{if } a_i \neq \omega \text{ and } a_{-i} \neq \omega, \\ 0 & \text{if } a_i \neq \omega \text{ and } a_{-i} = \omega \end{cases} \tag{1}$$

where, $1 \geq T \geq B \geq 0$.

Incumbent performance is judged in relative terms, with the electorate using the opposing politician's performance as a benchmark. In particular, the politician obtains the highest payoff 1 when she chooses the popular decision and the opposing politician does not. The electorate perceives the politician with the correct decision as the effective agent. In contrast, the politician does not get an payoff when she chooses the wrong decision when the opposing party chooses the popular decision. When the popular choice is implemented, the politicians both receive a popularity payoff T, less than or equal what they would have received if the electorate identifies them as the sole effective agent. The payoff for implementing a policy that is not the popular choice provides both politicians with utility $B \geq 0$. As both politicians perform poorly, the bad performance is downplayed, and the electorate may provide politicians a payoff for implementing a policy, albeit the incorrect one. This however works only in issues that are non-salient. For salient issues, the electorate only cares about the popular choice ($B = 0$).

Aside from popularity-related payoffs, a politician also receives payoff α if she takes the private decision — the decision that coincides with the state where her private agenda lies. The private choice is fixed at $\omega = 1$ for both politicians, and is done without loss of generality. We define the agenda payoff as:

$$\pi_A = \begin{cases} \alpha & \text{if } a_i = 1, \\ 0 & \text{if } a_i = 0, \end{cases} \tag{2}$$

where, $\alpha \geq 0$.

The extensive game is illustrated below:

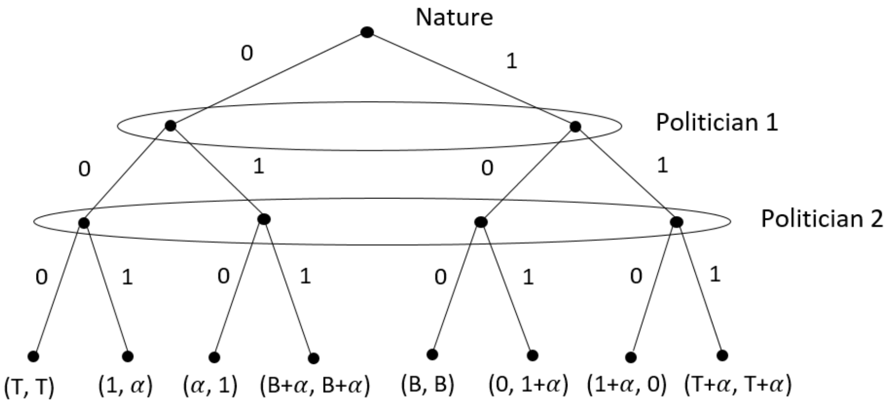


Figure 1: Extensive Form Game

Putting the popularity and private benefit payoffs together, the utility of a politician i is:

$$u_i(\omega,\, a_i, a_{-i}) = \begin{cases} 1+\alpha & if\, a_i = \omega,\;\; a_{-i} \neq \omega \;\text{ and }\; \omega = 1, \\ 1 & if\, a_i = \omega,\;\; a_{-i} \neq \omega \;\text{ and }\; \omega = 0, \\ T+\alpha & if\, a_i = \omega,\;\; a_{-i} = \omega \;\text{ and }\; \omega = 1, \\ T & if\, a_i = \omega,\;\; a_{-i} = \omega \;\text{ and }\; \omega = 0, \\ B+\alpha & if\, a_i \neq \omega,\;\; a_{-i} \neq \omega \;\text{ and }\; \omega = 0 \\ B & if\, a_i \neq \omega,\;\; a_{-i} \neq \omega \;\text{ and }\; \omega = 1 \\ \alpha & if\, a_i \neq \omega,\;\; a_{-i} = \omega \;\text{ and }\; \omega = 0 \\ 0 & if\, a_i \neq \omega,\;\; a_{-i} = \omega \;\text{ and }\; \omega = 1 \end{cases} \tag{3}$$

The expected utility of politician i is computed as follows:

$$EU_i(\sigma_i, \sigma_{-i}) = \sum_{\omega \in \Omega} \frac{1}{2}\, [P(a_i = \omega)(T\, P(a_{-i} = \omega) + P(a_{-i} \neq \omega)) + \tag{4}$$

$$B\, P(a_i \neq \omega) P(a_{-i} \neq \omega) + \alpha P(a_i = 1)] \tag{5}$$

A more detailed explanation on the derivation of the expected utility values is shown in Appendix A.

3 Strategies

The politicians can choose one of four strategies, $\sigma_i \in \Sigma = \{H, D, Z, C\}$, explained below:

- **Honest (H)**: Politician i employs the strategy *Honest* if she follows her signal, $a_i = \theta_i$, $\forall\, \theta_i$
- **Dishonest (D)**: Politician i is *Dishonest* if she always chooses the decision in which her private agenda lies, $a_i = 1$, $\forall\, \theta_i$.
- **Zero (Z)**: Politician i employs the strategy *Zero* if she always chooses $a_i = 0$, $\forall\, \theta_i$
- **Contrarian (C)**: Politician i is *Contrarian* if she always chooses the opposite of what her signal is, *i.e.* $a_i = \theta_i^{'}$, where $\theta_i^{'}$ is different from the signal θ_i

The four strategies provide an exhaustive list of strategies available to politician i.

The strategy honest leads politicians to always choose what she believes is the popular decision. The politician acts fully as a delegate. As the model does not provide expert information, the politician is perceived to be honest in her pursuit of the policy that is best for the public. The strategy pays off when the politician has good decision-making abilities (*i.e.* the quality of the signal q high enough). Note that the popular decision can also be the decision with the private benefit with a probability 1/2. Being honest is also an attractive option as it does not exclude the politician from the private benefit. An honest politician places a lot of stock in her popularity. Career politicians are most likely to consistently subscribe to the strategy honest.

Under dishonest, a politician always chooses the private benefit option. The politician acts without regard to public opinion, and tries to maximize out-of-office compensation. Politicians who always choose to be dishonest can be viewed in parallel with final term office holders, prioritizing popularity-related payoffs less than office-seeking politicians. Although the dishonest politician chooses the decision with the private benefit, this does not preclude her from reaping popularity payoffs as the decision with the private benefit can be the popular decision with a probability 1/2.

A politician who chooses zero, always chooses the decision without the private benefit. Similar to the strategy dishonest, a politician disregards public opinion. The probability that the choice of the politician is the popular decision is always 1/2. A politician who always chooses the decision without the private benefit can be viewed as one with a very strong policy preference.

Under contrarian, a politician always chooses differently from the signal θ_i. It is unlikely to observe a politician following this strategy, but we have included the strategy to provide an exhaustive list of all possible strategies. We show in Appendix C that the strategy contrarian is strictly dominated by the strategy honest.

Lemma 1. The strategy *Contrarian (C)* is strictly dominated by *Honest (H)*

The Contrarian strategy, choosing the action opposite the signal received, is a strictly dominated strategy for all potential opponent strategies. Under the strategy C, the probability that the action chosen is the state is $1 - q$. Recall that the quality of signal θ, q, ranges from 1/2 to 1. From this, we know $1 - q \in [0, 1/2]$. The odds of making the right choice under this strategy, $1 - q$, are very small. Furthermore, the decision where the private benefit lies is not prioritized. A rational politician with poor decision making abilities (*i.e.* $q = 1/2$) is indifferent between H and C, but is assumed to always chose to be honest. At very poor decision-making abilities, rational individuals would more likely prefer to follow the decision where their private benefit lies to maximize their utility. The popularity payoff from H, dependent on the probability of making the right choice, q is always higher than the corresponding payoff under C, while the expected private benefit $\alpha/2$ is the same for both. As players always prefer strategy H over C regardless of opponent strategies, C is never chosen as a best response, making it a strictly dominated strategy.

After eliminating the strictly dominated strategy, *Contrarian (C)*, only nine strategy profiles remain. A strategy profile (σ_i, σ_{-i}) is denoted by the strategies of politicians 1 and 2 side by side (*e.g.* $(H, H) = HH$). Policies are only implemented when both politicians choose the same strategy. Only three strategy profiles yield policy outcomes. The remaining profiles retain the status quo.

4 Analysis

We use the following definitions of Best Responses and Nash Equilibrium in this paper.

Definition. *Best Response*

$$BR_i(\sigma_{-i}) = \sigma_i \in \Sigma : EU_1(\sigma_i, \sigma_{-i}) \geq EU_1(\sigma_i', \sigma_{-i}) \text{ for all } \sigma_i' \in \Sigma$$

Definition. *Nash Equilibrium*

$$\sigma^* = (\sigma_1^*, \sigma_2^*) \in P \text{ is a Nash Equilibrium if } \sigma_i^* \in BR_i(\sigma_{-i}^*) \text{ for every } i \in N$$

The analysis performed looks at two possible cases: one for non-salient issues ($T = B$) and another for salient issues ($B = 0$). Both outcomes allow for the focus to be primarily on whether or not policies are implemented given the trade offs politicians face with their private benefit. The best responses and equilibrium outcomes are explored for each case, and the impact of each parameter is then performed. All the derivations can be found in full in the appendix. Only the final results are shown in subsequent analysis.

Let $BR_i(\sigma_{-i}) \subset \Sigma$ be the set of player is best response bids against $\sigma_{-i} \in \Sigma$. We begin with the determination of best responses for the three remaining strategies, honest (H), dishonest (D), and zero (Z), for non-salient issues.

4.1 Non-Salient Issues

When the issue is non-salient ($T = B$), the electorate is indifferent to the policy implemented. The issue is not of high relevance to the electorate but one where is a general consensus towards the correct decision, for example the mandatory allocation of unsold food from groceries to charities in France. The law or its variations do not directly affect the public, and a policy maker is still found to be effective if the other politician acts in a similar manner. The absence of distinction between electorate responses under the implementation of popular and non-popular policies can be observed in issues of little public relevance. The policy implementation payoffs in this case are equal, $B = T$. The electorate rewards the politicians a certain value T if a policy is implemented. The same value is awarded regardless if the enacted policy matches the popular decision. If the politicians choose opposite actions, only then does choosing the popular decision provide a larger benefit.

Best Responses For Non-Salient Issues ($B = T$)

When $\sigma_{-i} = H$

$$BR_i(H) = \begin{cases} H & if\ T \geq \frac{1-q}{1-2q} + \frac{\alpha}{(1-2q)^2}, \\ D & otherwise. \end{cases}$$

Recall from (1), the payoff of implementing the popular policy ($a_i = a_{-i} = \omega$) is given by T, and the payoff for implementing the wrong policy ($a_i = a_{-i} \neq \omega$) is given by B. As the issue is non-salient, the issues have no direct impact on the electorate. As long as a policy is implemented, a politician is perceived to be as effective as their competitors, with both politicians receiving T, as $B = T$. As T increases, the appeal of matching the opponent decision's increases. Looking at the threshold value for best response honest (H) when $\sigma_{-i} = H$, we find that the constraint $(1-q)/(1-2q)+\alpha/(1-2q)^2$ relaxes when $q < 0.5 + 2\alpha$. Recall that $q \in [1/2, 1]$. When $\alpha \geq 0.25$, q always satisfies the constraint, making the constraint relax as α increases. As q increases, the area where honest is a best response increases. Improving the decision-making ability of the politician leads to higher payoffs for the strategy honest, making it a more attractive option. A politician with very poor decision-making ability (*i.e.* $q = 1/2$) never chooses to be honest. As the accuracy of the strategy honest is very low, the payoff from the private decision, α, becomes more attractive, leading the politician to choose to be dishonest (D).

When $\sigma_{-i} = D$

$$BR_i(D) = \begin{cases} D & if\ T \geq q - \alpha, \\ H & if\ 1 - q - \alpha \leq T \leq q - \alpha, \\ Z & otherwise \end{cases}$$

Matching the strategy dishonest (D) with dishonesty is a best response only when the payoff from policy implementation$T$ is sufficiently high. As the decision-making ability q improves, the expected utility of choosing honest (H) increases, making dishonesty less attractive. The strategy H is only the best response when the incentive of matching opponent decision is not too high. However, if the T is sufficiently low given q and α, the politician capitalizes on the fact that each state is equally likely to be the popular decision and always choose the opposite decision and follow strategy zero (Z). Note however that when the politician chooses strategy zero (Z), the private benefit is forgone. As the decision-making ability of the politician q improves, choosing the opposing decision Z becomes less attractive as a best response, and politicians move to other options that allow for the private benefit payoffs to be reaped.

When $\sigma_{-i} = Z$

$$BR_i(Z) = \begin{cases} Z & if \;\; T \geq q + \alpha, \\ H & if \;\; 1 - q + \alpha \leq T \leq 0.5 + \alpha, \\ D & otherwise. \end{cases}$$

As observed previously, at a sufficiently high level of policy implementation payoff T, matching the opponent's decision becomes the best response. For very low levels of T, and subsequently at low levels of q, being dishonest (D) is the best response. When the payoffs from policy implementation are low, politicians with low levels of decision making ability are better off taking opposing positions to increase the odds of solely choosing the popular decision, and securing the highest level of popularity payoff.

From the best responses above, we obtain the bayesian Nash equilibrium, stated in Proposition 1.

Proposition 1. For non-salient issues ($B = T$)

1. If $T \geq \frac{1-q}{1-2q} + \frac{\alpha}{(1-2q)^2}$, there exists an equilibrium HH,
2. If $T \geq q - \alpha$, there exists an equilibrium DD,
3. If $T \geq q + \alpha$, there exists an equilibrium ZZ,
4. If $T < 1 - q - \alpha$, there exists two possible equilibria, ZD or DZ,
5. If $T < \frac{1-q}{1-2q} + \frac{\alpha}{(1-2q)^2}$ and
   $1 - q - \alpha < T < q - \alpha$, there exists two possible equilibria HD or DH.

Whether or not policies are passed depends on the decision-making abilities of the politicians and the size of their private benefit. Amongst all equilibrium conditions, only equilibria with at least one politician choosing the strategy dishonest (D) have constraints that relax as α increases (See point 2 of Proposition 1). Unsurprisingly, an increase in the size of the private benefit steers politicians from following the popular decision and decreases the likelihood for the popular policy to be passed. The higher the private benefit, the propensity for dishonesty increases.

From point 1 of Proposition 1, it is evident that as q increases, the higher the accuracy of the signal, the higher the payoffs for strategy H, making it more attractive for politicians. However, the conditions that underscore honesty as a stable equilibrium appear to be more complex than the conditions for dishonesty. The results state that the clearer the public opinion is on an issue, the more likely it is for politicians to take note of the popular opinion in the policy formation process.

In general, increasing policy implementation payoff T increases the chances of a policy being passed. However, as the electorate is assumed to be indifferent between policies ($B = T$), the popular policy is not always implemented. We find from point 3 of the Proposition 1 that at extremely high rewards on policy implementation and a sufficiently small private benefit, the politicians both choose strategy zero (Z), implementing a policy that is neither popular nor provides a private benefit. Despite the low private benefit payoff, the high policy implementation payoff provides both politicians to shirk and coordinate to implement a policy without regard to their signal q. Politicians may cease to follow what the electorate wants as they are rewarded for their decisions despite the implementation of subpar policies. We observe that politicians with lower decision- making abilities are more susceptible to this behaviour than better decision-makers.

Furthermore, when politicians with poor decision-making abilities are faced with low policy implementation payoffs, and a small private benefit, the politicians choose to implement a policy that is not in line with the private benefit. Both politicians can decide to ensure that they both get the payoff for policy implementation T, when the alternative offered by the private sector is not sufficiently high. As their decision-making ability is poor, the decision to employ strategy honest is risky as politicians may end up with no popularity-related payoffs.

For non-salient issues, a policy is always implemented if the policy implementation payoff, T, is greater than 1/2. It is useful to note that as the payoffs for implementing a popular and non-popular policy are the same (*i.e.* T=B), we expect for a higher level of coordination between the lobbyists. Looking at all equilibrium conditions in Proposition 1, an increase in the policy implementation payoff makes all pooling equilibria more likely. One would assume that with sufficiently low policy implementation rewards, politicians would prioritize their private benefit regardless of its amount - leading to the implementation of suboptimal policy decisions. However, we observe in this model that no policy is implemented when both the policy and private benefit incentives are very low. As politicians do not have much to gain from jointly choosing the popular choice, one chooses the option with the private agenda, while the other maximizes her expected utility by capitalizing on her opponent's dishonesty. By choosing the remaining option ($i.e.$ $a_i = 0$), the opponent increases her odds of being identified as the sole effective agent. Similarly at low policy rewards, good enough decision-makers with moderate private benefits find themselves diverging in strategies with one being dishonest and securing the private agenda values, and the other capitalizing on the other's dishonesty by following what she believes to be the popular decision.

In order to get a better understanding of the results, the equilibria for non-salient issues is shown in Figure 2.

4.2 Salient Issues

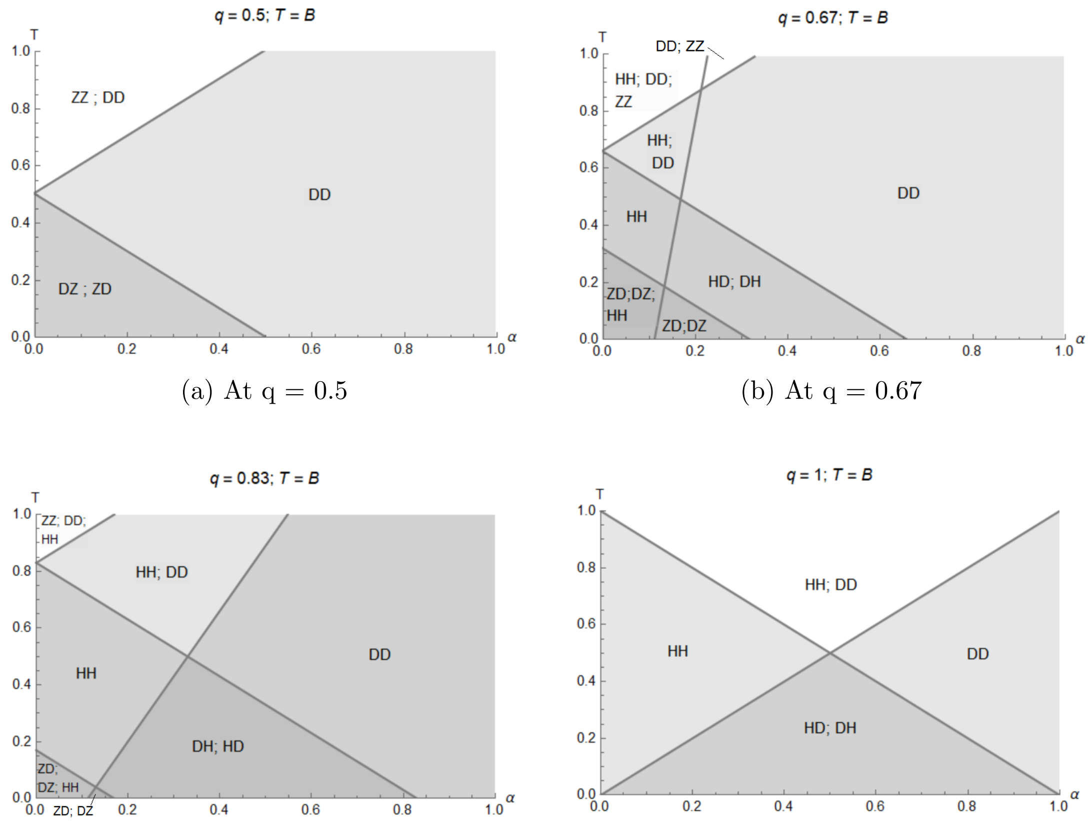
When the issue is salient, the electorate rewards politicians for implementing a policy only when it is optimal. Salient issues are often on a larger scale, for example taxation and health care, and affect the population directly. The implementation of a non-popular policy is equivalent to choosing the wrong action when the opposing politician has chosen the popular decision. The electorate's support is less flexible compared to non-salient issues. The implementation of an optimal policy yields politicians a payoff T each, otherwise no payoff is received, $B = 0$.

Best Responses For Salient Issues ($B = 0$)

When $\sigma_{-i} = H$

$$BR_i(H) = \begin{cases} H & if\ T \geq \frac{\alpha+2q^2-3q+1}{2q^2-q}, \\ D & otherwise. \end{cases}$$

Politicians only obtain payoffs when the popular decision matches their action, $a_i = \omega$.



(a) At q = 0.5 (b) At q = 0.67

(c) At = 0.83 (d) At q =1

Figure 2: Illustration of Equilibria for Non-Salient Issues

As T increases, the strategy honest (H) becomes more attractive. Furthermore, as the decision-making ability increases, the constraint $(\alpha + 2q^2 - 3q + 1)/(2q^2 - q)$ relaxes. Politicians with better decision-making abilities are more likely respond to honesty with honesty. When decision-making ability is poor, the politician is better off taking the strategy dishonest (D), securing private benefit and a fifty percent chance of obtaining the maximum popularity payoff 1.

When $\sigma_{-i} = D$

$$BR_i(D) = \begin{cases} D & if \ T \geq \frac{q-\alpha}{1-q}, \\ H & if \ \frac{1-q-\alpha}{q} \leq T \leq \frac{q-\alpha}{1-q}, \\ Z & otherwise \end{cases}$$

Similar to the case where the issue is non-salient ($T = B$), matching the strategy dishonest (D) with dishonest as a best response only occurs when the payoff from implementing the popular policy, T is sufficiently high, despite no rewards for the implementation of the wrong policy, $B = 0$. However, for salient issues, the minimum policy implementation for dishonest to be a best response is much higher. Comparing the two constraints, it can be observed that constraint for dishonest to best respond to dishonesty under salient issues is $1/(1-q)$ times of the constraint under non-salient issues. Improved decision-making ability q makes the strategy honest more attractive. As before, if both the poular policy implementation payoff T and private benefit α are low enough (i.e. $\alpha \leq 1-q$), and decision making ability is poor, the politician best responds by choosing the opposite decision with strategy zero (Z) and secure the maximum popularity payoff of 1 with a probability 1/2.

When $\sigma_{-i} = Z$

$$BR_i(Z) = \begin{cases} H & if\ T \geq 1+\alpha, \\ D & otherwise \end{cases}$$

The popular policy implementation payoff T needs to be sufficiently high for strategy zero (Z) to be the best response for strategy zero. However, as politicians are only rewarded when the correct decision is chosen or implemented as policy, it does not make sense for the politicians to coordinate and implement a policy without regard to the signal and no private benefit. The politician is better off being honest (H) when the payoff for implementing the popular policy is sufficiently high. At very low levels of policy implementation payoffs, politicians with poor decision making-skills obtain more by choosing to be dishonest (D) and taking the private benefit.

Proposition 2. For salient issues ($B = 0$),

1. If $T \geq \frac{\alpha+2q^2-3q+1}{2q^2-q}$, there exists an equilibrium HH,
2. If $T \geq \frac{q-\alpha}{1-q}$, there exists an equilibrium DD,
3. If $T < \frac{1-q-\alpha}{q}$, there exists two equilibria ZD or DZ,
4. If $T < \frac{\alpha+2q^2-3q+1}{2q^2-q}$ and
   $\frac{1-q-\alpha}{q} \leq T \leq \frac{q-\alpha}{1-q}$, there exists two equilibria HD or DH.

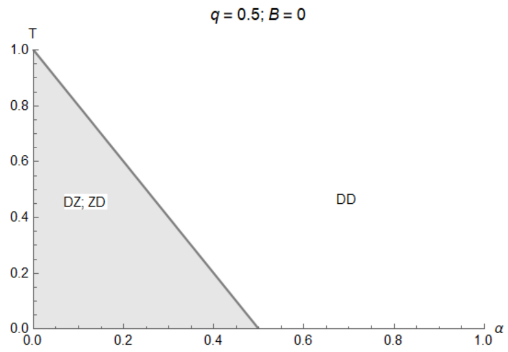
When issues are salient, the area where policy implementation is an equilibrium is smaller. The minimum payoffs for the implementation of the popular policy T required to observe coordination among politicians for all three strategies honest, dishonest, and zero, are higher compared to those under non-salient issues. As policy implementation only pays when the popular choice is implemented in salient issues, the higher policy payoff is necessary to compensate for the lower probability of securing popularity through policy. The certainty of a policy being implemented at sufficiently high levels of T now disappears as there is no gain to be made in passing suboptimal policy. As expected increasing the popular policy implementation payoff increases the chance of the popular policy to be implemented. Increased awareness and scrutiny from the electorate on politician actions have an effect on the type of policies implemented.

As only optimal choices are rewarded when issues are salient, pooling at ZZ, where both politicians settle on the action without the private benefit, provides a very low payoff. The action Z only comes into equilibrium in when the opposing politician chooses to be dishonest with both policy implementation payoffs and the private benefit sufficiently low. Politicians are better off trying to appear as the effective agent under this scenario and chooses the opposite of her opponent's action. When the decision making ability of politicians improves, this equilibrium becomes less likely, and politicians gravitate toward the strategy H.

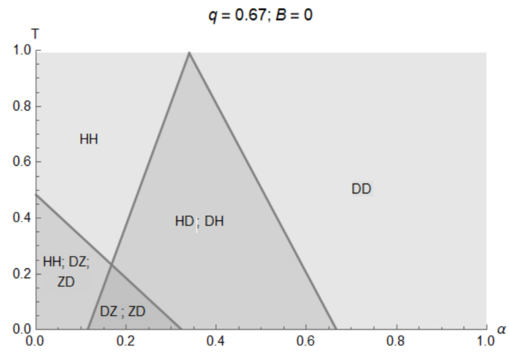
Proposition 2 is illustrated in Figure 3.

4.3 Variations in Popularity-Related Payoffs

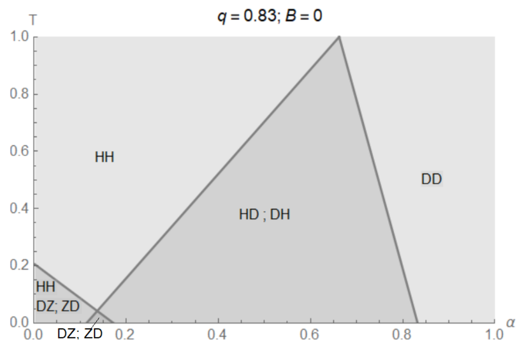
Although an increase in popularity-related payoffs increases the likelihood of honesty and subsequently the passing of popular policies, when there is no difference in the payoffs across different policy types, the room for politicians to ignore the wishes of the electorate also expands. When issues are non-salient, politicians are faced with different options to accumulate benefit, and choosing to follow their signal on the popular choice could be risky. It is not unlikely to see results that veer away from the popular law being passed. This corroborates existing empirical results that the salience of the issue has a direct impact on the influence of public opinion in policy (Wattenberg, 2004; Myatt, 2017). Consider the equilibrium ZZ, bad decision-makers implement a policy without any private agenda to secure very high popularity payoffs when the private benefits are very low. A possible



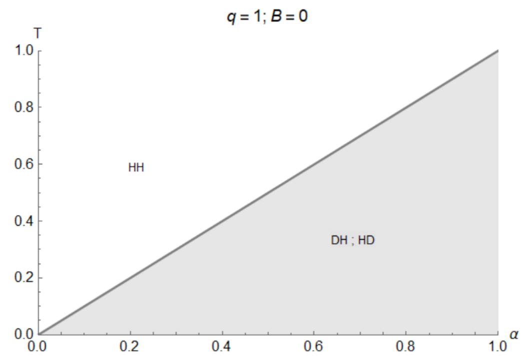
(a) At q = 0.5



(b) At q = 0.67



(c) At = 0.83



(d) At q =1

Figure 3: Illustration of Equilibria for Salient Issues

explanation for this is put forward by Burstein (2006) in his study of the effect of public opinion on random proposals within the US house of congress. Burstein (2006) found that the impact of public opinion is considerably less than previous statistical studies on the subject , summarized by (Page, 2002), but posits that this may be due to the public not having strong opinions, leaving room for organized interests to win.

One way to induce honesty is to distinguish between the implementation of policies that are popular and those that are not. Recall that for salient issues, $B = 0$. This represents the extreme case where there are no payoffs in policy unless it coincides with the popular choice. The multiplicity of equilibria observed when issues are non-salient disappears when we impose the condition that only the implementation of popular policy is implemented.

4.4 Variations in Private Benefit

Regardless of issue salience, an increase in private agenda-related payoffs unambiguously increase the politician's propensity to be dishonest. As the private gains increase relative to the rewards one stands to gain from passing a law, a rational individual tries harder to secure the private benefit. The result that an increase in the private gains available induces dishonesty amongst elected officials is not unexpected. Despite this, the increase in the likelihood of both politicians choosing dishonesty is tempered by higher levels of decision-making ability. Although the maximum value obtainable in the popularity-related payoffs is capped at one, values of $\alpha > 1$ are allowed. At $\alpha = 1$, the politician immediately chooses to be dishonest regardless of T, and is carried over for all private benefit values above that of the popularity payoffs.

4.5 Variations in Decision Making Ability

An increase in decision making ability reduces the minimum required policy implementation payoff T for honesty as an equilibrium strategy for both politicians, while increasing thresholds for dishonest and zero strategies. Decision-making ability is defined by the quality of the signal received. The quality of the signal received can encompass the innate abilities of the politician and the resources the politician has to gather information on public opinion. Unlike changes in the rewards of policy implementation, the increase in decision-making ability singularly pushes for the implementation of popular choices. Better decision-makers have more incentive to be honest as there is less risk in getting the popular choice correctly. Empirical results in India show that education increases the chances of selection to public office and makes politicians less likely to be opportunistic in office (Besley et al., 2005). This also supports the findings by Besley et al. (2011) where growth is higher when leaders are highly educated. The effect of decision-making ability on the selection of honest equilibrium strategies is more pronounced when the issue is more salient. As the electorate does not reward the suboptimal policies, politicians are more careful with their actions, and avoid passing policies without the private benefit when no information on the popular decision is available.

4.6 Analysis of Voter Welfare

The implementation of the popular policy improves voter welfare. The popular choice embodies the voter's choice. Recall that in our model, the electorate knows what is best for them. The voter welfare is measured by the probability that a popular policy is implemented under each possible pair of actions in equilibrium.

We summarize these probabilities in the table below.

Voter Welfare	
Equilibrium Actions	% of Popular Policy is Implemented
HH	q^2
DD	$\frac{1}{2}$
ZZ	$\frac{1}{2}$
HD	$\frac{1}{2}q$
ZD	0

When the decision making ability of the incumbents is poor, the electorate worse off when both politicians are honest than dishonest. However, once the decision-making ability of the politicians become sufficiently good ($q \geq 0.71$), the electorate welfare is always the highest when both politicians are honest. The welfare to the voters for the implementation of policy without regard to the popular decision is 1/2, which is simply the probability of the popular decision occurring. It can be observed that for all possible equilibrium pairs, pooling equilibria always provide higher welfare to the voter, as $q \in [1/2, 1]$, and voters are worse off when the politicians do not coordinate.

5 Conclusion

The paper explores a setting wherein two competing politicians decide on a policy. The decision requires the politician to consider the trade offs between following the popular choice and the private agenda option. Politicians receive a signal on the uncertain popular choice. We introduce a model of relative popularity: where the performance of the politician is benchmarked by the performance of her opponent. Depending on the policy rewards, the private benefit, and the decision-making ability of the politicians, a coordination or anti-coordination game is played.

Through a model of relative popularity, we find how a politician's private interests and public opinion affect policy outcomes. Higher payoffs from the private sectors increases the propensity of politicians to become dishonest. Increasing rewards on popular policy implementation increases the propensity of politicians to be honest regardless of issue salience. However, without distinction in policy implementation rewards, politicians find an incentive to collude and decide on one decision without regard to the popular choice. Introducing a distinction between optimal and suboptimal policies helps delineate the strategies better and implement optimal policy choices. Furthermore, an increased requirement in decision-making of politicians pushes towards the implementation of popular policies. It is possible to curb dishonest behavior and induce honest behaviour by increasing public regard on successful law implementation and a stronger perception on implementing the choices of a well-informed electorate.

We aim to provide another perspective on politician behaviour. By considering relative popularity, the model explores how politicians measure their responses given the actions of their opponent. The impact of re-election, and the introduction of a distinction between socially optimal and popular choices will be interesting to explore as future extensions to the model. The model can also be extended to multi-issue platforms with varying degrees of salience to find out when and where politicians compromise under a wide selection of issues that they are accountable for.

References

Abramowitz, A. I., Lanoue, D. J., and Ramesh, S. (1988). Economic conditions, causal attributions, and political evaluations in the 1984 presidential election. *The Journal of Politics*, 50(4):848–863.

Acemoglu, D., Johnson, S., and Robinson, J. (2004). Institutions as the fundamental cause of long-run growth. Working Paper 10481, National Bureau of Economic Research.

Alexandrova, P., Rasmussen, A., and Toshkov, D. (2016). Agenda responsiveness in the european council: public priorities, policy problems and political attention. *West European Politics*, 39(4):605–627.

Antle, R. and Smith, A. (1986). An empirical investigation of the relative performance evaluation of corporate executives. *Journal of Accounting Research*, 24(1):1–39.

Barro, R. (1973). The control of politicians: An economic model. *Public Choice*, Spring.

BBC (2012). Brazil 'mensalao' corruption trial concludes.

Berry, C. R. and Howell, W. G. (2007). Accountability and local elections: Rethinking retrospective voting. *The Journal of Politics*, 69(3):844–858.

Besley, T. and Burgess, R. (2002). The political economy of government responsiveness: Theory and evidence from india*. *The Quarterly Journal of Economics*, 117(4):1415–1451.

Besley, T., Montalvo, J. G., and ReynalQuerol, M. (2011). Do Educated Leaders Matter? *The Economic Journal*, 121(554):F205–227.

Besley, T., Pande, R., and Rao, V. (2005). Political Selection and the Quality of Government: Evidence from South India. STICERD - Political Economy and Public Policy Paper Series 08, Suntory and Toyota International Centres for Economics and Related Disciplines, LSE.

Blanes i Vidal, J., Draca, M., and Fons-Rosen, C. (2012). Revolving door lobbyists. *American Economic Review*, 102(7):3731–48.

Buan, L. (2019). Ombudsman: Revilla must pay back plundered p124.5m.

Burstein, P. (2003). The impact of public opinion on public policy: A review and an agenda. *Political Research Quarterly*, 56(1):29–40.

Burstein, P. (2006). Why Estimates of the Impact of Public Opinion on Public Policy are Too High: Empirical and Theoretical Implications. *Social Forces*, 84(4):2273–2289.

Cain, B. E. and Drutman, L. (2014). Congressional staff and the revolving door: The impact of regulatory change. *Election Law Journal: Rules, Politics, and Policy*, 13(1):27–44.

Canes-Wrone, B. and Shotts, K. W. (2004). The conditional nature of presidential responsiveness to public opinion. *American Journal of Political Science*, 48(4):690–706.

Carlsson, F., Johansson-Stenman, O., and Martinsson, P. (2007). Do you enjoy having more than others? survey evidence of positional goods. *Economica*, 74(296):586–598.

Chong, A., De La O, A. L., Karlan, D., and Wantchekon, L. (2015). Does corruption information inspire the fight or quash the hope? a field experiment in mexico on voter turnout, choice, and party identification. *The Journal of Politics*, 77(1):55–71.

Cleary, M. R. (2007). Electoral competition, participation, and government responsiveness in mexico. *American Journal of Political Science*, 51(2):283–299.

Di Tella, R. and Franceschelli, I. (2011). Government advertising and media coverage of corruption scandals. *American Economic Journal: Applied Economics*, 3(4):119–51.

Easterlin, R. A. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior & Organization*, 27(1):35 – 47.

Erikson, R. S., Wright, G. C., and McIver, J. P. (1989). Political parties, public opinion, and state policy in the united states. *American Political Science Review*, 83(3):729–750.

Evans, G. and Andersen, R. (2006). The political conditioning of economic perceptions. *The Journal of Politics*, 68(1):194–207.

Faccio, M. (2006). Politically connected firms. *American Economic Review*, 96(1):369–386.

Ferejohn, J. (1986). Incumbent performance and electoral control. *Public Choice*, 50(1/3):5–25.

Ferguson, T. and Voth, H.-J. (2008). Betting on HitlerThe Value of Political Connections in Nazi Germany*. *The Quarterly Journal of Economics*, 123(1):101–137.

Fisman, R. (2001). Estimating the value of political connections. *American Economic Review*, 91(4):1095–1102.

Gali, J. (1994). Keeping up with the joneses: Consumption externalities, portfolio choice, and asset prices. *Journal of Money, Credit and Banking*, 26(1):1–8.

Goldman, E., Rocholl, J., and So, J. (2013). Politically Connected Boards of Directors and The Allocation of Procurement Contracts. *Review of Finance*, 17(5):1617–1648.

Hagemann, S., Hobolt, S. B., and Wratil, C. (2017). Government responsiveness in the european union: Evidence from council voting. *Comparative Political Studies*, 50(6):850–876.

Healy, A. and Malhotra, N. (2010). Random events, economic losses, and retrospective voting: Implications for democratic competence. *Quarterly Journal of Political Science*, 5(2):193–208.

Kenski, H. C. (1977). The impact of economic conditions on presidential popularity.

Khwaja, A. I. and Mian, A. (2005). Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market*. *The Quarterly Journal of Economics*, 120(4):1371–1411.

King, J. D. (2001). Incumbent popularity and vote choice in gubernatorial elections. *Journal of Politics*, 63(2):585–597.

Krueger, A. O. (1974). The political economy of the rent-seeking society. *The American Economic Review*, 64(3):291–303.

Ljungqvist, L. and Uhlig, H. (2000). Tax policy and aggregate demand management under catching up with the joneses. *American Economic Review*, 90(3):356–366.

Luechinger, S. and Moser, C. (2014). The value of the revolving door: Political appointees and the stock market. *Journal of Public Economics*, 119:93 – 107.

Malhotra, N. and Margalit, Y. (2014). Expectation setting and retrospective voting. *The Journal of Politics*, 76(4):1000–1016.

Manza, J. and Cook, F. L. (2002). A democratic polity?: Three views of policy responsiveness to public opinion in the united states. *American Politics Research*, 30(6):630–667.

McCrone, D. J. and Kuklinski, J. H. (1979). The delegate theory of representation. *American Journal of Political Science*, 23(2):278–300.

Myatt, D. P. (2017). A theory of protest voting. *The Economic Journal*, 127(603):1527–1567.

Page, B. (2002). *The Semi-Sovereign Public*, pages 325–344. Oxford University Press.

Page, B. I. and Shapiro, R. Y. (1983). Effects of public opinion on policy. *The American Political Science Review*, 77(1):175–190.

Pavo, N. (2018). Corruption as the only option: The limits to electoral accountability. *The Journal of Politics*, 80(3):996–1010.

PulseAsia (2019). January 2019 nationwide survey on the may 2019 senatorial elections.

Rivas, J. (2013). Private agenda and re-election incentives. Working paper, Bath, U. K.

Svolik, M. W. (2013). Learning to love democracy: Electoral accountability and the success of democracy. *American Journal of Political Science*, 57(3):685–702.

Thompson, M. (2016). Tony blair closes controversial consultancy business.

Tsai, L. L. (2007). Solidary groups, informal accountability, and local public goods provision in rural china. *American Political Science Review*, 101(2):355372.

Wattenberg, M. P. (2004). Elections: Personal popularity in u.s. presidential elections. *Presidential Studies Quarterly*, 34(1):143–155.

A Expected Utility Values when $B = T$

The expected utility value of politicians for non-critical issues, $B = T$, can be computed as follows:

$$EU_i(\sigma_i, \sigma_{-i}) = \sum_{\omega \in \Omega} [\frac{1}{2}(T\, P(a_i = \omega)P(a_{-i} = \omega) + P(a_i = \omega)P(a_{-i} \neq \omega) + B\, P(a_i \neq \omega)P(a_{-i} \neq \omega)] + \alpha P(a_i = 1)$$

Recall that payoffs do not differ according to the policy implemented, $B = T$, and the each state is equally likely, $P(\omega = 0) = P(\omega = 1) = \frac{1}{2}$.

Expected Utility of Player 1 when $\sigma_i = \sigma_{-i} = H$

$$\begin{aligned} EU_1(H, H) &= P[\omega = 0]X + P[\omega = 1]Y \\ &= T + q(1 - 2T) - q^2(1 - 2T) + 0.5\alpha \end{aligned}$$

where,

$$X = \underbrace{\underbrace{T}_{\pi_{P_i}} \underbrace{q}_{P(a_i=\omega)} \underbrace{q}_{P(a_{-i}=\omega|\omega=0)}}_{a_i = a_{-i} = \omega} + \underbrace{\underbrace{1}_{\pi_{P_i}} \underbrace{q}_{P(a_i=\omega)} \underbrace{(1-q)}_{P(a_{-i}\neq\omega|\omega=0)}}_{a_i = \omega \neq a_{-i}} + \underbrace{\underbrace{T}_{\pi_{P_i}} \underbrace{(1-q)}_{P(a_i\neq\omega)} \underbrace{(1-q)}_{P(a_{-i}\neq\omega|\omega=0)}}_{a_i = a_{-i} \neq \omega} + \underbrace{\alpha}_{\pi_{R_i}} \underbrace{(1-q)}_{P(a_i=1)}$$

$$Y = \underbrace{\underbrace{T}_{\pi_{P_i}} \underbrace{q}_{P(a_i=\omega)} \underbrace{q}_{P(a_{-i}=\omega|\omega=1)}}_{a_i = a_{-i} = \omega} + \underbrace{\underbrace{1}_{\pi_{P_i}} \underbrace{q}_{P(a_i=\omega)} \underbrace{(1-q)}_{P(a_{-i}\neq\omega|\omega=1)}}_{a_i = \omega \neq a_{-i}} + \underbrace{\underbrace{T}_{\pi_{P_i}} \underbrace{(1-q)}_{P(a_i\neq\omega)} \underbrace{(1-q)}_{P(a_{-i}\neq\omega|\omega=1)}}_{a_i = a_{-i} \neq \omega} + \underbrace{\alpha}_{\pi_{R_i}} \underbrace{q}_{P(a_i=1)}$$

The remaining expected utilities are computed in a similar fashion:

$$EU_1(H,D) = 0.5q + 0.5T + 0.5\alpha$$
$$EU_1(H,Z) = 0.5q + 0.5T + 0.5\alpha$$
$$EU_1(H,C) = q^2(1-2T) + 2qT + 0.5\alpha$$

$$EU_1(D,H) = 0.5 - 0.5q + 0.5T + \alpha$$
$$EU_1(D,D) = T + \alpha$$
$$EU_1(D,Z) = 0.5 + \alpha$$
$$EU_1(D,C) = 0.5q + 0.5T + \alpha$$

$$EU_1(Z,H) = 0.5 - 0.5q + 0.5T$$
$$EU_1(Z,D) = 0.5$$
$$EU_1(Z,Z) = T$$
$$EU_1(Z,C) = 0.5q + 0.5T$$

$$EU_1(C,H) = 1 + q^2(1-2T) + 2q(T-1) + 0.5\alpha$$
$$EU_1(C,D) = 0.5(1-q) + 0.5T + 0.5\alpha$$
$$EU_1(C,Z) = 0.5(1-q) + 0.5T + 0.5\alpha$$
$$EU_1(C,C) = q^2(2T-1) - q(2T-1) + T + 0.5\alpha$$

As the players are symmetric, the corresponding strategy combinations yields the same expected utility values (*e.g.* $EU_1(H,D) = EU_2(D,H)$).

B Expected Utility Values when $B = 0$

The expected utility value of politicians when the issue is critical $B = 0$ is given below:

$$EU_i(\sigma_i, \sigma_{-i}) = \sum_{\omega \in \Omega} \frac{1}{2}(T\,P(a_i = \omega)P(a_{-i} = \omega) + P(a_i = \omega)P(a_{-i} \neq \omega) + \alpha P(a_i = 1)$$

The expected utility functions are computed similarly with the previous case, and are shown as follows:

$$EU_1(H, H) = q^2(T - 1) + q + 0.5\alpha$$
$$EU_1(H, D) = 0.5q(T + 1) + 0.5\alpha$$
$$EU_1(H, Z) = 0.5q(T + 1) + 0.5\alpha$$
$$EU_1(H, C) = q(q + T - qT) + 0.5\alpha$$

$$EU_1(D, H) = 0.5q(T - 1) + 0.5 + \alpha$$
$$EU_1(D, D) = 0.5T + \alpha$$
$$EU_1(D, Z) = 0.5 + \alpha$$
$$EU_1(D, C) = 0.5(q + T - qT) + \alpha$$

$$EU_1(Z, H) = 0.5q(T - 1) + 0.5$$
$$EU_1(Z, D) = 0.5$$
$$EU_1(Z, Z) = 0.5T$$
$$EU_1(Z, C) = 0.5((1 - q)T + q)$$

$$EU_1(C, H) = q^2(1 - T) + q(T - 2) + 1 + 0.5\alpha$$
$$EU_1(C, D) = 0.5T + q(-0.5T - 0.5) + 0.5 + 0.5\alpha$$

$$EU_1(C,Z) = 0.5T + q(-0.5T - 0.5) + 0.5 + 0.5\alpha$$
$$EU_1(C,C) = q(q(T-1) - T + 1) + (1-q)T + 0.5\alpha$$

As the players are symmetric, the corresponding strategy combinations yields the same expected utility values (*e.g.* $EU_1(H,D) = EU_2(D,H)$).

C Proof of Lemma 1

Definition. Strictly Dominated Strategies

Player i 's strategy σ_i'' **strictly dominates** her strategy σ_i' if

$$EU_i(\sigma_i'', \sigma_{-i}) > EU_i(\sigma_i', \sigma_{-i}) \text{ for every list } \sigma_{-i} \text{ of the other players' strategies.}$$

The strategy σ_i' is **strictly dominated**.

Expected Utilities for strategies H and C are compared for all possible opponent strategies. Only player one values are used in the proof as the players are symmetric.

Note that at $q = 1/2$ the expected utilities for H and C are equal. We assume that the politician i always chooses H in this scenario.

- **HH vs CH**

$$\begin{aligned}
EU_1(H,H) &> EU_1(C,H) \\
T + q(1-2T) - q^2(1-2T) + 0.5\alpha &> 1 + q^2(1-2T) + 2q(T-1) + 0.5\alpha \\
T + q(1-2T) - 2q^2(1-2T) &> 1 + 2q(T-1) \\
T + 3q - 4qT - 2q^2(1-2T) - 1 &> 0 \\
T(1-4q) + 4q^2T &> 2q^2 - 3q + 1 \\
T(1-4q+4q^2) &> 2q^2 - 3q + 1 \\
T &> \frac{1-q}{1-2q} \\
T &\geq 0.5 + \frac{0.25}{0.5 - q}
\end{aligned}$$

Recall that $q \in [\frac{1}{2}, 1]$. As q approaches 1, the T threshold, $0.5 + \frac{0.25}{0.5 - q}$, becomes less negative. The values of threshold at $q = \frac{1}{2}$ and $q = 1$ are given below:

$$\begin{aligned}
q = \frac{1}{2}: &\qquad lim_{q \to \frac{1}{2}} \quad 0.5 + \frac{0.25}{0.5 - q} = -\infty \\
q = 1: &\qquad 0.5 + \frac{0.25}{0.5 - 1} = 0
\end{aligned}$$

The threshold function $0.5 + \frac{0.25}{0.5 - q}$ is continuously differentiable in the interval $q \in [\frac{1}{2}, 1]$, and is monotonically increasing. As the maximum threshold value is 0 at $q = 1$, it follows for all permissible values of q, we find that T satisfies the threshold condition as $0 \leq T \leq 1$. Therefore, $EU_1(H, H) > EU_1(C, H)$.

- **HD vs CD**

$$
\begin{aligned}
EU_1(H, D) &> EU_1(C, D) \\
0.5q + 0.5T + 0.5\alpha &> 0.5(1 - q) + 0.5T + 0.5\alpha \\
q &> 1 - q
\end{aligned}
$$

As $q > 1 - q$ when $q \neq 1/2$, and politician i always chooses H when $q = 1/2$, $EU_1(H, D) > EU_1(C, D)$.

- **HZ vs CZ**

$$
\begin{aligned}
EU_1(H, Z) &> EU_1(C, Z) \\
0.5q + 0.5T + 0.5\alpha &> 0.5(1 - q) + 0.5T + 0.5\alpha \\
q &> 1 - q
\end{aligned}
$$

As $q > 1 - q$ when $q \neq 1/2$, and politician i always chooses H when $q = 1/2$, $EU_1(H, Z) \geq EU_1(C, Z)$.

- **HC vs CC**

$$EU_1(H, C) > EU_1(C, C)$$

$$
\begin{aligned}
q^2(1\ -2T)+2qT+0.5\alpha &> q^2(2T-1)-q(2T-1)+T+0.5\alpha \\
2q^2(1\ -2T)+4qT-T &> q \\
-4q^2T+4qT-T &> q-2q^2 \\
-T(4q^2-4q+1) &> q-2q^2 \\
T(2q-1)^2 &< q(2q-1) \\
T &< \frac{q}{2q-1}
\end{aligned}
$$

Similar to **HH vs CH**, we obtain the threshold values at $q=\frac{1}{2}$ and $q=1$:

$$
\begin{aligned}
q=\frac{1}{2}: &\qquad lim_{q\to\frac{1}{2}} \quad \frac{q}{2q-1}=\infty \\
q=1: &\qquad \frac{q}{2q-1}=1
\end{aligned}
$$

The threshold function $\frac{q}{2q-1}$ is continuously differentiable in the interval $q\in[\frac{1}{2},1]$, and is monotonically decreasing. As the minimum threshold value is 1 at $q=1$, it follows for all permissible values of q, we find that T satisfies the threshold condition as $0\leq T\leq 1$. Therefore, $EU_1(H,C)>EU_1(C,C)$.

We have demonstrated in the above that the Contrarian strategy C is strictly dominated by strategy H, when $B=T$. For $B=0$, no payoffs are obtained for choosing the suboptimal choice. As the probability of choosing the popular decision is always higher in H than in C, it follows that all expected utilities under H isalways be greater than those under C, holding σ_{-i} constant. Therefore, the Contrarian strategy C is also strictly dominated by strategy H when $B=0$.

D Derivation of Best Responses when $B = T$

The best responses are obtained for each of the three remaining strategies: $\Sigma_i = \{\, H,\ D,\ Z\}$. All calculations shown arerepresentative of the expected utility of any player $i \in 1,\ 2$.

When $\sigma_{-i} = H$

$$\begin{aligned}
EU_1(H, H) &= T + q(1-2T) - q^2(1-2T) + 0.5\alpha \\
EU_1(D, H) &= 0.5 - 0.5q + 0.5T + \alpha \\
EU_1(Z, H) &= 0.5 - 0.5q + 0.5T
\end{aligned}$$

For all possible combinations of T, q, and α, $EU_1(D, H) \geq EU_1(Z, H)$. Looking for T values where $EU_1(H, H) \geq EU_1(D, H)$,

$$\begin{aligned}
EU_1(H, H) &\geq EU_1(D, H) \\
T + q(1-2T) - q^2(1-2T) + 0.5\alpha &\geq 0.5 - 0.5q + 0.5T + \alpha \\
0.5T - 2qT + 2q^2T &\geq 0.5 - 1.5q + 0.5\alpha + q^2 \\
0.5T(1-2q)^2 &\geq 0.5 - 1.5q + 0.5\alpha + q^2 \\
T &\geq \frac{1 - 3q + 2q^2 + \alpha}{(1-2q)^2} \\
T &\geq \frac{(1-q)(1-2q) + \alpha}{(1-2q)^2} \\
T &\geq \frac{1-q}{1-2q} + \frac{\alpha}{(1-2q)^2}
\end{aligned}$$

The best responses for $\sigma_{-i} = H$ are given as follows:

$$BR_i(H) = \begin{cases} H & if\ T \geq \frac{1-q}{1-2q} + \frac{\alpha}{(1-2q)^2}, \\ D & otherwise. \end{cases}$$

When $\sigma_{-i} = D$

$$\begin{aligned}
EU_1(H,D) &= 0.5q + 0.5T + 0.5\alpha \\
EU_1(D,D) &= T + \alpha \\
EU_1(Z,D) &= 0.5
\end{aligned}$$

Three threshold conditions are necessary to determine the set of best responses for $\sigma_{-i} = D$

$$\begin{aligned}
EU_1(D,D) &\geq EU_1(H,D) \\
T + \alpha &\geq 0.5q + 0.5T + 0.5\alpha \\
0.5T &\geq 0.5q - 0.5\alpha \\
T &\geq q - \alpha
\end{aligned}$$

$$\begin{aligned}
EU_1(H,D) &\geq EU_1(Z,D) \\
0.5q + 0.5T + 0.5\alpha &\geq 0.5 \\
0.5T &\geq 0.5 - 0.5q - 0.5\alpha \\
T &\geq 1 - q - \alpha
\end{aligned}$$

$$\begin{aligned}
EU_1(D,D) &\geq EU_1(Z,D) \\
T + \alpha &\geq 0.5 \\
T &\geq 0.5 - \alpha
\end{aligned}$$

From the conditions above, the best responses for $\sigma_{-i} = D$ are given as follows:

$$BR_i(D) = \begin{cases} D & if \;\; T \geq q - \alpha, \\ H & if \;\; 1 - q - \alpha \leq T \leq q - \alpha, \\ Z & otherwise \end{cases}$$

When $\sigma_{-i} = Z$

$$EU_1(H,Z) = 0.5q + 0.5T + 0.5\alpha$$
$$EU_1(D,Z) = 0.5 + \alpha$$
$$EU_1(Z,Z) = T$$

Three threshold conditions are necessary to determine the set of best reponses for $\sigma_{-i} = Z$

$$\begin{aligned} EU_1(H,Z) &\geq EU_1(D,Z) \\ 0.5q + 0.5T + 0.5\alpha &\geq 0.5 + \alpha \\ 0.5T &\geq 0.5 + 0.5\alpha - 0.5q \\ T &\geq 1 - q + \alpha \end{aligned}$$

$$\begin{aligned} EU_1(Z,Z) &\geq EU_1(D,Z) \\ T &\geq 0.5 + \alpha \end{aligned}$$

$$\begin{aligned} EU_1(Z,Z) &\geq EU_1(H,Z) \\ T &\geq 0.5q + 0.5T + 0.5\alpha \\ 0.5T &\geq 0.5q + 0.5\alpha \\ T &\geq q + \alpha \end{aligned}$$

From the conditions above, the best responses for $\sigma_{-i} = Z$ are given as follows:

$$BR_i(Z) = \begin{cases} Z & if \;\; T \geq q + \alpha, \\ H & if \;\; 1 - q + \alpha \leq T \leq 0.5 + \alpha, \\ D & otherwise. \end{cases}$$

E Derivation of Best Responses when $B = 0$

When $\sigma_{-i} = H$

$$EU_1(H,H) = q^2(T-1) + q + 0.5\alpha$$
$$EU_1(D,H) = 0.5q(T-1) + 0.5 + \alpha$$
$$EU_1(Z,H) = 0.5q(T-1) + 0.5$$

For all possible combinations of T, q, and α, $EU_1(D,H) \geq EU_1(Z,H)$. Looking for T values where $EU_1(H,H) \geq EU_1(D,H)$,

$$\begin{aligned} EU_1(H,H) &\geq EU_1(D,H) \\ q^2(T-1) + q + 0.5\alpha &\geq 0.5q(T-1) + 0.5 + \alpha \\ q^2T - 0.5qT &\geq 0.5\alpha + q^2 - 1.5q + 0.5 \\ 0.5T(2q^2 - q) &\geq 0.5\alpha + q^2 - 1.5q + 0.5 \\ T &\geq \frac{\alpha + 2q^2 - 3q + 1}{2q^2 - q} \end{aligned}$$

The best responses for $\sigma_{-i} = H$ are given as follows:

$$BR_i(H) = \begin{cases} H & if\ T \geq \frac{\alpha+2q^2-3q+1}{2q^2-q}, \\ D & otherwise. \end{cases}$$

When $\sigma_{-i} = D$

$$EU_1(H,D) = 0.5q(T+1) + 0.5\alpha$$
$$EU_1(D,D) = 0.5T + \alpha$$
$$EU_1(Z,D) = 0.5$$

The T conditions where strategy σ_i provides higher payoffs than σ_i' given $\sigma_{-i} = D$ are as follows:

$$\begin{aligned}
EU_1(D,D) &\geq EU_1(H,D) \\
0.5T + \alpha &\geq 0.5q(T+1) + 0.5\alpha \\
T &\geq q(T+1) - \alpha \\
T(1-q) &\geq q - \alpha \\
T &\geq \frac{q-\alpha}{1-q}
\end{aligned}$$

$$\begin{aligned}
EU_1(H,D) &\geq EU_1(Z,D) \\
0.5q(T+1) + 0.5\alpha &\geq 0.5 \\
qT + q &\geq 1 - \alpha \\
T &\geq \frac{1-q-\alpha}{q}
\end{aligned}$$

$$\begin{aligned}
EU_1(D,D) &\geq EU_1(Z,D) \\
0.5T + \alpha &\geq 0.5 \\
T &\geq 1 - 2\alpha
\end{aligned}$$

From the conditions above, the best responses for $\sigma_{-i} = D$ are given as follows:

$$BR_i(D) = \begin{cases} D & if \;\; T \geq \frac{q-\alpha}{1-q}, \\ H & if \;\; \frac{1-q-\alpha}{q} \leq T \leq \frac{q-\alpha}{1-q}, \\ Z & otherwise \end{cases}$$

Note that $\frac{1-q-\alpha}{q} \leq 1 - 2\alpha, \;\; \forall q.$

When $\sigma_{-i} = Z$

$$
\begin{aligned}
EU_1(H, Z) &= 0.5q(T + 1) + 0.5\alpha \\
EU_1(D, Z) &= 0.5 + \alpha \\
EU_1(Z, Z) &= 0.5T
\end{aligned}
$$

As before, the conditions where σ_i provides higher payoffs than σ'_i given $\sigma_{-i} = D$ are shown below:

$$
\begin{aligned}
EU_1(H, Z) &\geq EU_1(D, Z) \\
0.5q(T + 1) + 0.5\alpha &\geq 0.5 + \alpha \\
q(T + 1) &\geq 1 + \alpha \\
T &\geq \frac{1 - q + \alpha}{q}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(Z, Z) &\geq EU_1(D, Z) \\
0.5T &\geq 0.5 + \alpha \\
T &\geq 1 + 2\alpha
\end{aligned}
$$

$$
\begin{aligned}
EU_1(Z, Z) &\geq EU_1(H, Z) \\
0.5T &\geq 0.5q(T + 1) + 0.5\alpha \\
0.5T(1 - q) &\geq 0.5q + 0.5\alpha \\
T &\geq \frac{q + \alpha}{1 - q}
\end{aligned}
$$

From the conditions above, the best responses for $\sigma_{-i} = Z$ are given as follows:

$$
BR_i(Z) = \begin{cases} Z & if\ T \geq \frac{q+\alpha}{1-q}, \\ H & if\ 1 + \alpha \leq T < \frac{q+\alpha}{1-q}, \\ D & otherwise \end{cases}
$$

Note that, for $q \geq \frac{1}{2}$, $\frac{q+\alpha}{1-q} \geq 1$. As $T \leq 1$, $BR_i(Z) = Z$ is not feasible. The final $BR_i(Z)$ function is givent below:

$$BR_i(Z) = \begin{cases} H & if \ T \leq 1 + \alpha, \\ D & otherwise \end{cases}$$

V

Paper 2:
Incumbent Competition and Pandering

Statement of Authorship

This declaration concerns the article entitled:									
Incumbent Competition and Pandering									
Publication status (tick one)									
draft manuscript	x	**Submitted**		**In review**		**Accepted**		**Published**	
Publication details (reference)									
Candidate's contribution to the paper (detailed, and also given as a percentage).	The candidate contributed to/ considerably contributed to/predominantly executed the… Formulation of ideas: 100% Design of methodology: 100% ~~Experimental work:~~ Presentation of data in journal format: 100%								
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.								
Signed	Anne Marie Go					**Date**	07/05/2019		

Incumbent Competition and Pandering

Anne Marie Go *

Abstract

Two politicians choose an action to maximize popularity with only partial information on the popular choice – the choice preferred by the public, and the socially-optimal choice – the choice that maximizes public welfare. Although choosing the popular choice increases the popularity of politicians, pandering costs can be incurred when the socially optimal choice is revealed to be different from the popular choice. The paper looks at the types of policies passed for salient issues – issues for which following the popular choice provides higher payoffs, and non-salient issues – issues for which the popular choice does not always provide higher payoffs, given different levels of clarity on public opinion. We find that for salient issues, a divided public is better than a united but ill-informed one. For non-salient issues, policies are always passed when public opinion is clear, while politicians diverge strategically under low policy payoffs when public opinion is unclear. The model provides insights on when pandering is observed and what policies are formed under a relative popularity framework.

JEL Classication: D72, C79

*Department of Economics, University of Bath; Email: a.go@bath.ac.uk

1 Introduction

Within most representative democracies, the gains associated with positions of power make the decision to pander — to follow the public opinion regardless of reason— attractive. The decision to pander becomes more difficult when public sentiment does not align with expert opinion. Politicians perform a delicate balancing act between keeping their constituents happy and choosing what they believe is best for the public to lead the popularity race. Critical questions need to be explored to understand politician positions in policy: When the preference of the public does not align with what the politicians believe to be socially optimal, does the politician still follow the public choice? Under what conditions does pandering occur? If there is uncertainty on public choice, do politicians follow what they think is socially-optimal? Does the importance of the issue change politician behaviour and the corresponding policy outcomes?

In this paper, a model of relative popularity is used to study two politicians who have to decide on policy actions given beliefs on both popular and socially optimal choices. With relative popularity, a politician's actions may be perceived better or worse in conjunction to the actions of the opponent. Each politician has a signal on the uncertain popular choice and a signal on the uncertain socially optimal choice. The paper focuses on the case where the public knows the popular choice but not the socially optimal choice. The actions of the politicians are revealed to the public, and the public rewards politicians when they follow the popular choice. We define a pandering politician as one who always follows the popular choice regardless of her information on the socially-optimal state. The public perceives a politician to be pandering if she is rewarded for choosing the popular action and the socially optimal choice is revealed to be different from the popular choice. The setup allows us to explore pandering under salient and non-salient issues, at varying levels of information on public opinion, pandering costs and policy payoffs.

The paper finds that uncertainty in the public opinion on issues lead politicians to take divergent positions to maximize the chance of being identified as the most effective agent. The results show that the salience of the issue affects the implementation and the type of policy outcome. Issue salience captures how important the issue is to the public. Non-salient issues, such as deregulations in finance or voter identification, are covered less in the media, and do not have a strong effect the popularity of the politicians. Salient issues, such as hot button issues, are perceived to be more important to the public, and strongly affects the popularity of politicians.

When the popular choice is uncertain and the issue is non-salient, very high popularity rewards on policy implementation lead politicians to implement any policy regardless of public opinion and welfare. When the popular choice is uncertain and the issue is salient, the game unfolds similarly to that of an anti-coordination game. Politicians choose to strategically diverge unless the pandering costs are extremely high. The likelihood of each option being the socially optimal choice does not affect the policies implemented in both salient and non-salient issues. The only impact is the type of divergence in positions taken if no policy is implemented. When the popular choice is clear, different policy results appear. Pandering is widely observed under this scenario. Salient issues push politicians towards pandering when private information is accurate. Politicians who do not pander obtain no payoff, leaving politicians no choice but to pander. Non-salient issues always result to policy implementation. Politicians can advertise their effectiveness with little consequence when they agree with issues with low salience (Thomson, 2001). With clear popular choice, the game becomes a simple coordination game, politicians gain as much as they can by implementing a policy for non-salient issues, and avoid getting no payoffs by pandering for salient issues.

Overall, the results indicate that a divided public, where popular opinion is not clear, may be better than a united yet ill-informed public. The model can be used to understand the behavior of politicians when they can be held directly accountable for their actions. Coalition partnerships, as observed in the UK and Germany, can be studied under this model. Our results support the empirical results of Eichorst (2014) where coalition partners report low salience issues under less divided policy dimensions, and high salience issues under more divided policy dimensions.

The model provides an explanation as to why coalition agreements do not only showcase likely successes, but also diverging political positions as observed empirically (Timmermans, 2006; Moury, 2011; Eichorst, 2014). The results also highlight the importance of issue salience in political accountability. If media scrutiny on issues considered to be non-salient is heightened, this can push non-salient issues into the forefront of public awareness, and reduce the implementation of suboptimal policies. The findings also support Jacobs and Shapiro (2000) where they show that politicians do not pander as much as conventional wisdom suggests. Even when there is no uncertainty on the popular choice, we find that pandering is not always a unique equilibrium outcome. Politicians, under the correct combination of incentives to follow public opinion and disincentives to pander, can choose to follow what they believe to be socially optimal in equilibrium. Increasing public responsiveness on politician performance can push politicians into taking the socially optimal choice into account.

The paper aims to contribute to the understanding of pandering in politicians. Although there is vast literature available on pandering, focusing largely on information communication, voter targeting, and electoral competition (McGraw et al., 2002; Che et al., 2013; Morelli and Weelden, 2013; Maskin and Tirole, 2014; Gratton, 2014; Kartik et al., 2015), the model is, to the best of my knowledge, the first to study pandering under a relative popularity framework. We also introduce a distinction between the popular choice and the socially optimal choice. When politicians are provided information on the popular and socially optimal choices separately, the decision to pander is defined clearly, and the behaviour of politicians and their propensity to pander can be explored thoroughly.

Under the relative popularity framework, the public does not perceives the actions of an incumbent independently, but in conjunction with her opponent's actions. In an environment where the public is well-informed, and the popular decision coincides with what nature reveals to be, *ex post*, the socially optimal decision, a politician is rewarded when the action chosen is the popular choice. A good politician is perceived better with an ill-perceived opponent, whilst a bad politician is worse off if the opponent is well-perceived. Take for example the recent U.S. elections, Gallup pre-election polls showed that both Trump and Clinton had the "worst election-eve images of any major-party presidential candidates Gallup has measured back to 1956," with 61% and 52 % perceiving them unfavorably, respectively (Saad, 2016). It can be argued that if a less disliked candidate ran against Trump, the results of the election might have been different. The model takes this adjustment in public perception into account, providing a more realistic framework to understand politician actions and policy outcomes.

The interaction between politicians and the process of policy-making is also often studied with the threat of non-reelection, such as Alvarez and Franklin (1994); Grossman and Helpman (1996); Canes-Wrone et al. (2001). In this paper, the analysis is simplified by looking at popular opinion on a policy under a binary setting. The uncertainty is retained in the popular and socially optimal choices. Simplifying preferences to a binary choice allows for the analysis of issues where individuals with varying policy preferences can be classed largely into pro and anti sentiments. The comparisons inherent in political competition, specifically in two party systems, are reflected in the model's relative popularity model. Removing the assumption that election is the primary driving force for actions taken in office, different aspects that may influence the policies passed can be explored in full.

Pandering is also explored in this paper. We have previously defined a pandering politician as one who always follows the popular choice regardless of her information on the socially-optimal state. The definition of pandering in this paper is centered on the responsiveness of policy on public opinion. The effects of public opinion on policy has been studied substantially. Jacobs and Shapiro (1997) argued against the presence of pandering in politics, noting that politicians and their staff reported little reliance on polls in policy formation and more use as a tool for effective communication. We move away from the assumption of a rational electorate. The electorate's decision on the popular choice encompasses more than what is socially-optimal, and may be influenced by factors outside the issues including race, gender, and emotional judgments (Timpone, 1998; Isbell and Ottati, 2002). The observed rise of populism in countries within and outside Europe in recent years contradict this and corroborate the findings of Page and Shapiro (1983) and Burstein (2003) that policies on salient issues are found to be largely influenced by public opinion. Outcomes on non-salient issues, on the other hand, are often less congruent with public opinion Burstein (2003), and provide more room for politicians to pursue personal interests.

Looking further into the influence of issue salience on politician responsiveness, we can find examples of how issue salience is played out in the policy making process. When issues are non-salient, policy implementation is used as a signal of on how effective politicians can be for more important issues. Constituents may focus on divergent positions, but are often not interested in specific policy outcomes. Non-salient issues such as voter identification restrictions in the 2016 US elections are discussed with differing opinions from member of the public, but policies are rewarded similarly for both options. Other examples include issues on industry regulation, inheritance taxation, among others. For salient issues, the public reacts strongly on politician performance. Consider the issue of gun laws in the United States; Factions of the public cannot fully agree on the controls that need to be implemented in gun laws. Results from a Pew Research Center 2017 survey showed that 74% of gun owners and 35% of non-owners considering the right to bear arms as an essential right (Igielnik and Brown, 2017). Despite examples elsewhere in the UK, Australia and Canada on the effectiveness of stricter gun control, the implementation of stricter gun laws could impinge on the perceived freedom of citizens. Consequences given American attitudes on guns are graver for U.S. politicians. The politicians are aware of this and find that the easiest way to maximize popularity is to strategically diverge into opposing positions, with the Republicans against and the Democrats for gun reform. We try and capture the shifts observed in politician behaviour by incorporating salience in the model.

We explore the model and the results thoroughly in the rest of the paper. We begin with the model setup and the timing of the game in sections 2 and 3, strategies in section 4, a discussion of the results including best-responses and equilibria for salient and non-salient issues, and voter welfare analysis in section 5, and concluding remarks in section 6.

2 The Model

Nature selects both a socially optimal choice, $\omega^* \in \Omega^* = \{0, 1\}$, and a popular choice, $\omega_p \in \Omega_p = \{0, 1\}$, which are assumed to be independent of each other.

There are two politicians, $i \in I = 1, 2$. The politicians know that the socially optimal states occurs with the following probabilities: $P(\omega^* = 0) = r$, and $P(\omega^* = 1) = 1 - r$, where $\frac{1}{2} \leq r \leq 1$, and; the popular states occur with the following probabilities: $P(\omega_p = 0) = P(\omega_p = 1) = 1/2$ for the popular choice. [1] Each politician receives a signal $\theta_i \in \{0, 1\}$ on the popular choice, with an accuracy of q_i. The signal indicates what the politicians believe the popular choice is, and its quality , q, can be characterized as follows.:

$$P(\theta_i = \omega_p) = q_i$$

A politician i chooses an action $a_i \in A_i = \{0, 1\}$. Both politicians choose simultaneously, and a policy is passed once both politicians choose the same action. Politicians know their own and their opponent's decision making ability or the quality of signal on the popular choice.

The public is non-strategic in the model. The public knows only the popular choice. The public initially assesses the performance of the politicians based on the popular choice, ω_p. The politicians enjoy their popularity in the electorate. The popularity payoffs are given below:

[1] By setting $r \geq \frac{1}{2}$, decision 0 is more likely to be socially optimal. This is without loss of generality.

$$\pi_i = \begin{cases} 1 & if\, a_i = \omega_p \;\; and \;\; a_{-i} \neq \omega_p, \\ T & if\, a_i = \omega_p \;\; and \;\; a_{-i} = \omega_p, \\ B & if\, a_i \neq \omega_p \;\; and \;\; a_{-i} \neq \omega_p, \\ 0 & if\, a_i \neq \omega_p \;\; and \;\; a_{-i} = \omega_p. \end{cases}$$

where $1 \geq T \geq B \geq 0$.

A policy is implemented when both politicians choose the same action. Recall that relative popularity is used in the assessment of politician's performance. The utility obtained from choosing the popular choice when the opposing party does not is the highest value 1. The public perceives the politician who follows the popular choice as the effective agent. In contrast, choosing the unpopular choice when the opposing party chooses the popular choice provides the politician no utility. The implementation of the popular choice provides the politicians an increase T in their utilities, less than or equal what they would have received if the public positively identifies them as the effective agent. Implementing a policy which is not the public choice provides a utility value of $B > 0$, as the passing of the policy is still seen as a positive, albeit a non-representative, governmental response. Policies that are not in line with the popular choice can yield politicians at most the payoff for implementing the popular choice, T.

The payoff for implementing policies different from the popular decision can be rewritten as $B = \gamma T$, where $\gamma \in [0, 1]$. The salience of the issue is captured by γ. When issues are salient to the public, differences in popularity gained from policy implementation are stark. As the stakes are perceived to be higher, only decisions that align with the popular opinion obtain public approval ($i.e.$ $\gamma = 0$). In constrast, non-salient issues are only thrust in the spotlight when politicians take divergent decisions. Policies are valued by the public equally when issues are non-salient, politicians are rewarded for passing policies instead of the type of policy passed ($i.e.$ $\gamma = 1$).

After the actions of the politicians are announced, the socially optimal choice is revealed to the politicians and the public. The public punishes pandering politicians by decreasing their popularity. The decrease in popularity, herein referred to as the pandering cost, is given by:

$$\delta_i = \begin{cases} 0 & if\, a_i \neq \omega_p, \\ 0 & if\, a_i = \omega_p \;\; and \;\; \omega_p = \omega^*, \\ c & if\, a_i = \omega_p \;\; and \;\; \omega_p \neq \omega^*. \end{cases}$$

Pandering in this model is defined as the act of following the popular choice to please the public despite knowing that it is not socially optimal. More specifically, if a politician is rewarded by choosing the popular action, the revelation of a different socially optimal choice leads the public to punish the perceived pandering. The popularity of a politicians decreases by a fraction c when caught pandering. The punishment from pandering is directly related to how voters react upon learning about politician actions. Krosnick and Kinder (1990) studied the effect of the news on the secret sale of weapons on Iran in support of the Nicarguan funds in the approval ratings of Ronald Reagan under the theory of priming. Under the priming theory defined in their paper, the more attention provided by media on a specific area, the more the electorate incorporates the acquired information in the judgment of the president. Krosnick and Kinder (1990) found that outside increasing public awareness on the government's intervention in Central America, the information on the weapon sale affected the evaluation of Reagan's overall performance more than his character assessment. Price et al. (1997) also showed in an experiment with university students that receiving information on an issue relevant to them, (*i.e.* funding cuts), significantly affects the topical focus of receivers, and the subsequent thoughts generated on the issue.

We incorporate this in the interpretation of pandering in the model. Pandering cost is incurred when a politician reaps rewards from choosing the popular state, and the socially optimal state revealed is different from the popular state. The electorate adjusts their evaluation of politician performance when a mismatch in the popular choice and socially-optimal choice is observed. More specifically, pandering costs affect payoffs where the politicians are compensated for choosing the popular choice, the payoff for the implementation of the popular policy, T, and the payoff for being identified as the sole effective agent, 1. The inclusion of the socially optimal decision alters the expected utilities for each strategy differently. The cost of pandering $c \in [0, 1]$ may also be viewed as the expected cost taking into account the probability of getting caught.

Incorporating pandering δ_i to the popularity payoffs π_i, the utility of the politicians are provided below:

$$
u_i(\omega_p, a_i, a_{-i}) = \begin{cases} 1 & if\, a_i = \omega_p,\ a_{-i} \neq \omega_p,\ and\ \omega_p = \omega^*, \\ 1-c & if\, a_i = \omega_p,\ a_{-i} \neq \omega_p,\ and\ \omega_p \neq \omega^*, \\ T & if\, a_i = \omega_p,\ a_{-i} = \omega_p,\ and\ \omega_p = \omega^*, \\ T-c & if\, a_i = \omega_p,\ a_{-i} = \omega_p,\ and\ \omega_p \neq \omega^*, \\ B & if\, a_i \neq \omega_p,\ a_{-i} \neq \omega_p,\ and\ \omega_p = \omega^*, \\ B & if\, a_i \neq \omega_p,\ a_{-i} \neq \omega_p,\ and\ \omega_p \neq \omega^*, \\ 0 & if\, a_i \neq \omega_p,\ a_{-i} = \omega_p,\ and\ \omega_p = \omega^*, \\ 0 & if\, a_i \neq \omega_p,\ a_{-i} = \omega_p,\ and\ \omega_p \neq \omega^*. \end{cases}
$$

The simultaneous-move Bayesian game (N, Ω, Σ, r, Θ, u) is formally defined as follows:

1. There are $N = \{1, 2\}$ incumbent politicians.
2. The state $\Omega = (\Omega^*, \Omega_p)$ where $\Omega^* = \{0, 1\}$ and $\Omega_p = \{0, 1\}$.
3. The set of strategies $\sigma_i \in \Sigma_i$ for politician i to determine the action $a_i \in A_i = 0, 1$.
4. The probability $\omega^* = 0$, r.
5. The signal on ω_p, $\theta_i \in \Theta_i = 0, 1$ with quality $q \in [1/2, 0]$.
6. A payoff function for each player i: $u_i(\sigma_1, \sigma_2; \theta_1, \theta_2)$.

Only politicians play the above Bayesian game. The strategy spaces, the payoff functions, probability of the socially-optimal states occurring, and the signal quality on popular choice are assumed to be common knowledge.

The analysis of the model focuses on two main environments: one where the popular opinion is unclear to politicians ($q_i = q_{-i} = 0.5$), and another where it is ($q_i = q_{-i} = 1$). In comparing policy results for both salient and non-salient issues between the two extremes, the effects of pandering can be studied in more detail.

3 Timing of the Game

1. Nature chooses the socially-optimal choice $\omega^* \in \{0, 1\}$. The socially optimal choice is the choice that most benefits the public. Politicians do not have prior policy preferences, and are aware of how likely each action is to be the socially optimal choice.
2. Politicians each receive a signal on the socially-optimal choice.
3. The public decides on a popular choice $\omega_p \in \{0, 1\}$. Both states are equally likely.
4. Politicians each receive a signal on the popular choice.
5. Politician i chooses an action $a_i \in \{0, 1\}$. A policy gets passed if $a_i = a_{-i}$, otherwise status quo is preserved.
6. The popular choice is revealed. The public rewards politicians with popularity if the popular action is chosen or a policy is implemented.
7. The socially optimal choice is revealed. The public punishes the politician if pandering is observed. A politician is perceived to pander when the popular choice is chosen over the socially optimal one.

4 Strategies

The politicians can choose one of six strategies, $\sigma_i \in \Sigma_i = \{P, L, R, C, G, D\}$:

- **Pander (P)** : Politician i employs the strategy *Pander* if he follows his signal, $a_i = \theta_i, \forall\, \theta_i$
- **Left (L)**: Politician i employs the strategy *Left* if he always chooses $a_i = 0, \forall\, \theta_i$
- **Right (R)**: Politician i employs the strategy *Right* if he always chooses $a_i = 1, \forall\, \theta_i$
- **Contrarian (C)**: Politician i is *Contrarian* if he always chooses the opposite of what his signal is, *i.e.*, $a_i = \theta_i^{'}$, where $\theta_i^{'}$ is different from the signal θ_i
- **Good (G)**: Politician i is *Good* if he always chooses the action that he believes maximizes public welfare. More specifically, if $P(\omega^*) > \frac{1}{2}$, the politician chooses $a_i = \omega^*$, regardless of his signal.

- **Destructive (D)**: Politician i is Destructive if he always chooses the action oppostie of the one he believes maximizes public welfare, *i.e.*, if $P(\omega^*) > \frac{1}{2}$, the politician chooses $a_i \neq \omega^*$, regardless of his signal.

The six strategies above are exhaustive. We discuss each strategy in more detail below.

A politician who always chooses the strategy pander (P) always chooses the action that he believes is the popular choice. A pandering politician disregards his signal on the socially optimal choice. As the electorate reward politicians exclusively on how their actions align with the popular choice, pandering can provide a politician with significant popularity payoffs. The strategy is expected to pay off when the information the politician has on the popular choice is good. When the signal of the politician on the popular choice is very good, the probability the action is rewarded is higher. Note however, that when the socially-optimal choice is revealed and the electorate finds that the politician is rewarded for choosing a popular action that is not the socially-optimal choice, the politician is punished.

Politicians always choose a preferred action for strategies left (L) and (R). As the states of the popular choice are equally likely, politicians have a fifty percent chance of choosing the popular choice. Politicians who always choose strategies left and right do not take into account the signals they receive on the popular choice and the socially-optimal choice. The strategy pays off the most when the information the politician has on the popular choice is minimal. We can draw a parallel with real world politics through politicians with very strong ideological beliefs – with little regard to the preferences of their counsituencies.

A contrarian (C) politician always chooses the decision opposite to the signal received on the popular choice. As with the pandering politician, the contrarian always disregards his signal on the socially optimal choice. The strategy is very risky. As with Go (2016), the contrarian strategy C is always strictly dominated by strategy P. The accuracy of the action taken, with respect to the popular choice, under strategy C is always less than 1/2. With the signal accuracy at $q_i \geq 1/2$, payoffs under strategy P are always larger than those under strategy C.

Under the strategy good (G) , the politician always chooses the action that he believes is the socially-optimal choice. The politician minimizes the cost of pandering by following the signal on the socially optimal choice. However, by disregarding the signal on the popular choice, the politician only has a fifty percent probability of securing the popularity-realted payoffs. When the costs on pandering are very high, becoming a good politician may pay off.

Lastly, for the strategy destructive (D), a politician always chooses the action opposite to his signal on the socially-optimal choice. Although the politician faces a higher risk of being penalised if the socially-optimal choice is not in line with the popular choice, the strategy destructive provides the politician a fifty percent chance of securing a popularity related payoff. Furthermore, if the opposing politician has a propensity to be good, the politician can look like the effective agent prior to the revelation of the socially-optimal choice by employing the destructive strategy.

5 Results

5.1 Expected Utilities

The expected utility of a politician, without, pandering costs, is given by:

$$EU_i(\sigma_i, \sigma_{-i}) = \sum_{\omega \in \Omega} [P(\omega_p = \omega)(T\,P(a_i = \omega)P(a_{-i} = \omega) + P(a_i = \omega)P(a_{-i} \neq \omega) + B\,P(a_i \neq \omega)P(a_{-i} \neq \omega)]$$

Taking into account pandering costs, the expected utility of a politician can be written as follows:

$$\begin{aligned} EU_i(\sigma_i, \sigma_{-i}) = &\sum_{\omega \in \Omega} [P(\omega_p = \omega)((P(a_i = \omega)(T\,P(a_{-i} = \omega) + P(a_{-i} \neq \omega)) + B\,P(a_i \neq \omega)P(a_{-i} \neq \omega))] - \\ &\sum_{\omega \in \Omega} [cP(\omega^* \neq \omega)P(\omega_p = \omega)(T\,P(a_i = \omega)P(a_{-i} = \omega) + P(a_i = \omega)P(a_{-i} \neq \omega))] \end{aligned}$$

The analysis of the results is broken down into two main cases, one where politicians have no information on the popular choice, another where full information is available. For each case, politician actions and policy implications for both salient and non-salient issues are studied in detail. The following definitions are used in the computation of best response and Bayesian Nash equilibria. The computations are shown in full in the appendices.

Definition. *Best Response*

$$BR_i(\sigma_{-i}) = \sigma_i \in \Sigma : EU_1(\sigma_i, \sigma_{-i}) \geq EU_1(\sigma_i', \sigma_{-i}) \text{ for all } \sigma_i' \in \Sigma$$

Definition. *Nash Equilibrium*

$$\sigma^* = (\sigma_1^*, \sigma_2^*) \text{ is a Nash Equilibrium if } \sigma_i^* \in BR_i(\sigma_{-i}^*) \text{ for every } i \in N$$

5.2 Case 1: Popular Choice is Unclear ($q_i = q_{-i} = \frac{1}{2}$)

The popular choice is unclear when both politicians have bad signals, $q_i = q_{-i} = 1/2$. At $q = 1/2$, the politician's signal on popular choice does not provide him with additional information.

Proposition 1

When the popular choice is unclear ($q_i = q_{-i} = \frac{1}{2}$) and the issue is non-salient ($\gamma = 1$),

1. If $T \geq \frac{1}{2-c}$, there exist only four possible equilibria (L,L), (R,R), (G,G), or (D,D),
2. If $\frac{1}{2} - \frac{1}{2}c \leq T < \frac{1}{2-c}$, there exists a unique equilibrium (G,G),
3. If $\frac{2+c-4cr}{4-c} \leq T < \frac{1}{2} - \frac{1}{2}c$ and $r > \frac{7-c}{8}$, there exists only two possible equilibria (G,D) or (D,G),
4. If $T < \frac{1}{2} - \frac{1}{2}c$, $T < \frac{2+c-4cr}{4-c}$, and $r \leq \frac{7-c}{8}$, there exist only four possible equilibria (R,L), (L,R), (G,D), and (D,G).

We illustrate Proposition 1 in Figure 1.

When the issue is non-salient, $\gamma = 1$, the popularity expected from passing a policy does not vary across decisions *(B=T)*. The politicians have no clear indication on what the electorate prefers given very poor signal quality on the popular choice. Pandering does not provide politicians any additional benefits. Although the electorate has a preferred decision, only divergence in positions can provide politicians with differing popularity payoffs. Consider, for instance, the bill on the additional requirements in voter identification. The issue is only highlighted when there are dissenting opinions from politicians, and is pushed into media scrutiny; Otherwise, politicians are perceived to be performing their duties in office.

If the rewards for implementing policy, T and B , are high enough, politicians gravitate

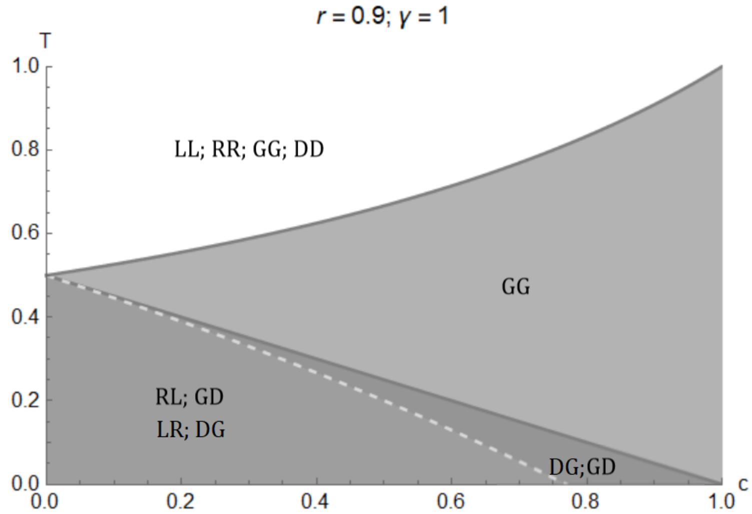


Figure 1: Non-Salient Issue with Relative Certainty on Socially Optimal Choice given $q = \frac{1}{2}$

towards a single decision, without regard to the popular and socially optimal decisions, to maximize their popularity payoffs. High pandering costs pushes politicians towards pursuing the socially optimal decision. As there is no clear indication on the popular choice, pandering is very risky for politicians, and the costs on being perceived as a pandering politician deters them from straying from what the likely socially optimal decision is. The pursuance of socially optimal policies are then observed at moderate policy popularity payoffs, and at higher policy payoffs for very high pandering costs. For very low rewards for policy implementation, there are no incentives for politicians to choose similar positions. As one politician tries to minimize pandering costs by choosing the socially optimal decision (G), the other chooses the antithetical position (D) to maximize the chances of being identified as the sole effective agent.

Proposition 2

When the popular choice is unclear ($q_i = q_{-i} = \frac{1}{2}$) and the issue is salient ($\gamma = 0$),

1. If $T \geq 1 - c$, there exists a unique equilibrium (G,G),
2. If $\frac{2+c-4cr}{2-c} \leq T < 1 - c$ and $r > \frac{4-c}{4}$, there exists only two possible equilibria (G,D) or (D,G),

3. If $T < 1 - c$, $T < \frac{2+c-4cr}{2-c}$ and $r \leq \frac{4-c}{4}$, there exists only four possible equilibria (R,L), (L,R), (G,D) or (D,G).

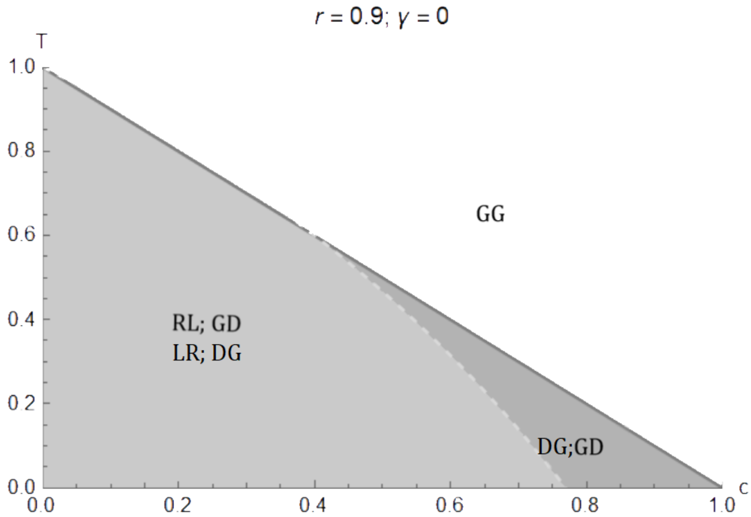


Figure 2: Salient Issue with Relative Certainty on Socially Optimal Choice given $q = \frac{1}{2}$

When issues are salient, $\gamma = 0$, implementing the decision that is not popular is the same as choosing the wrong decision. With Proposition 2, if the payoffs for the implementation of the socially-optimal policy are high implementation is high enough, politicians gravitate towards the socially optimal decision. The results echo those from a study conducted by Mooney and Lee (2000) on U.S. Death Penalty Reform from 1965 to 1982 focusing on the impact of consensus versus contentious policies. Mooney and Lee (2000) found that for morality issues, which are highly salient, politicians try their best to reflect public opinion under the right incentives, even though there may be a dearth of information and public opinion. It may be possible that expert opinion, or the likely socially-optimal choice, is used to stand in for popular opinion. Literature on public opinion also find that salient issues show higher degrees of responsiveness from politicians (Page and Shapiro, 1983; Edwards et al., 1995; Burstein, 2003). This may be due to the impact salient issues have on re-election prospects. Note that as there are no incentives in pursuing decisions that are not the popular decision, $B = 0$, no other pair of equilibria strategies are pooling, outside both politicians choosing to be good and following the more likely socially-optimal choice. Pandering is difficult since the signal on public choice is hazy. At low payoffs for popular policy implementation, politicians maximize by pursuing dissenting positions. Note that as the certainty on the socially-optimal choice, r, increases, the difference between the payoffs in G and L decrease. Proposition 2 is summarized in Figure 2.

5.3 Case 2: Popular Choice is Clear ($q_i = q_{-i} = 1$)

The popular choice is clear when the signal received is always correct, $q_i = q_{-i} = 1$. Politicians know exactly what the public wants, making pandering a very attractive option. The analysis shows that pandering may not always be the most preferred option despite the accuracy of the signal on public opinion. The policy outcomes differ depending on the salience of the issue discussed.

Proposition 3

When the popular choice is clear ($q_i = q_{-i} = 1$) and the issue is non-salient ($\gamma = 1$),

1. If $T \geq 1 - c$, there exists only two possible equilibria (P,P) or (G,G),
2. If $T \geq 1 - cr$ and $T \geq \frac{1}{2-c}$, there exists only two possible equilibria (P,P) or (L,L) , and
3. If $T \geq 1 - c(1 - r)$ and $T \geq \frac{1}{2-c}$, there exists only two possible equilibria (P,P) or (R,R).

When the popular choice is clear and the issue is non-salient, politicians pander in equilibrium. Recall that the payoffs for policy implementation are the same regardless if it coincides with the popular choice ($T = B$). Coordinating to follow the popular choice allows both politicians to secure the payoffs from implementing a policy. However, it is not the only possible equilibria outcome. When the cost of pandering is sufficiently high, the implementation of the socially optimal policy is an equilibrium. Similar to the observations from Mooney and Lee (2000), with the correct incentives, politicians can be pushed to follow the public opinion. However, as the issue is non-salient, this is no longer a unique outcome. All equilibrium strategy pairs are pooling and result to policy implementation. When there is no uncertainty on the popular choice for a non-salient issue, politicians implement any policy. Doing so may signal effectiveness as an agent, politicians who deliver on simple promises, advertise the outcomes in the hopes of increasing rewards from the electorate (Thomson, 2001). In an empirical study on coalitional agreeements, Eichorst (2014) noted that published agreements of coalition partners included low salience issues under policies on which they are less divided. Politicians may also use the non-salient nature of the issue to pursue what they think is best for the public (see points 3 and 4 in Proposition 3).

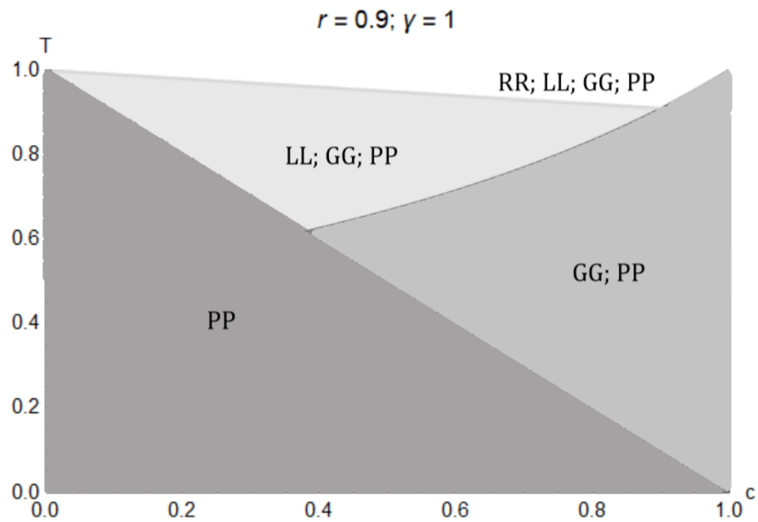


Figure 3: Non-Salient Issue with Relative Certainty on Socially Optimal Choice given $q = 1$

Proposition 4

When the popular choice is clear and the issue is salient ($\gamma = 0$), both politicians pander in equilibrium (P,P).

There are no benefits in choosing any action that does not match the public opinion for non-salient issues. Politicians only obtain popularity payoffs when the action chosen aligns with the popular choice. As politicians are certain on what the public opinion is, the certainty of the payoffs offset any pandering cost. Furthermore, if an opponent panders, choosing not to pander increases the chances of being perceived as the less effective agent. The pandering equilibrium is in contrast to the findings of Mooney and Lee (2000) where the political elite is one-sided the political elite has a very significant influence on the policy change. However, it is important to note that as the model only considers popularity payoffs, by ignoring the information on the popular choice, the politicians forgoes any possible utility, leaving pandering as the only possible profitable option. The likelihood of having issues where public opinion is consolidated is low.

The shift in the set of equilibria observed between the two cases provides very valuable insights on how politicians behave when they can get caught pandering. The lack of influence of polls on policy formation as noted by Jacobs and Shapiro (1997) may be due to the issues discussed and the accuracy of politician information on public opinion. We continue with discussing the impact of each dimension on the policy outcomes in more detail.

5.4 Impact of Public Opinion on Policy Outcomes

The quality of information politicians receive on the popular choice affects the policy implemented. The effects vary for salient and non -salient issues. The results support finding from existing literature where politicians are observed to be more responsive when issues are salient (Page and Shapiro, 1983; Weaver, 1991; Edwards et al., 1995; Burstein, 2003).

For salient issues, when the popular choice is unclear, the socially optimal policy is implemented when the policy payoff T is sufficiently high. At lower levels of T, no policy is implemented. Politicians prefer to diverge and attempt to be perceived as the more effective agent. When the policy choice is clear and the issue is salient, politicians unequivocally pander to the public. For important issues, the results indicate that a divided public, where popular opinion is not clear, may be better than a united yet ill-informed public.

For non-salient issues, politicians implement policies across a wider combination of policy implementation payoffs and pandering costs when the quality of information on popular choice improves. When the popular choice is clear, a policy is always implemented. The popular opinion is always followed when the policy implementation payoffs are sufficiently low. Otherwise, politicians can choose to implement policies that may not necessary align with the popular opinion. In contrast, policies are only implemented under sufficiently high payoffs when the quality of information is poor. Politicians with poor private information always follow the decision that they believe provide socially optimal outcomes under moderate policy implementation payoffs and sufficiently high pandering cost deterrents. The area in which politicians can select from different pooling equilibria observed is reduced substantially when the quality of private information drops.

The paper finds that politicians place more consideration on what is socially optimal when the demands of the public are not clear. Politicians, when issues are highly salient, may follow

ptimal decision. The results echo those from a study conducted by Mooney and Lee (2000) on U.S. Death Penalty Reform from 1965 to 1982 focusing on the impact of consensus versus contentious policies. Mooney and Lee (2000) found that for morality issues, which are highly salient, politicians try their best to reflect public opinion under the right incentives, even though there may be a dearth of information and public opinion. It may be possible that expert opinion, or the likely socially-optimal choice, is used to stand in for popular opinion. Literature on public opinion also find that salient issues show higher degrees of responsiveness from politicians (Page and Shapiro, 1983; Edwards et al., 1995; Burstein, 2003).

5.5 Impact of Salience on Policy Outcomes

Burstein (2003) in his review of the impact of public opinion in public policy noted that the salience of the issue does affect public policy. The equilibrium results for both salient and non-salient issues corroborate this result. The analysis shows that when issues are salient, only one equilibrium result provides a concrete policy outcome. Non-salient issues, on the other hand, provide more equilibria that result to policy.

When popular choice is unclear, salient issues result to either a divergence in politician actions, or the implementation of the socially optimal policy. The public receives a socially optimal policy or remain in the status quo. Policy outcomes under non-salient issues are not as straightforward. Politicians have more discretion on what policies to implement, with the exception of moderate policy implementation payoffs where only the socially-optimal policy is implemented. When private information is low, politicians are more careful on deciding on which policies to pass. When payoffs from implementing policy are low, politicians prefer to diverge in position to appear as the effective agent.

When popular choice is clear, salient issues push politicians to exclusively pander - only the popular policy can be implemented. Non-salient issues provide politicians with more room to choose between the popular, socially optimal, and ideology-based policies. Politicians can always choose to implement the popular policy; the policy options increase as the implementation payoff increases.

Although issue salience ensures the implementation of socially optimal policy where popular choice is unclear, the opposite is observed when politicians have excellent private information on the popular choice. Politicians pander exclusively in this environment. Salience is not the best indicator of when politicians put their constituents best interest in mind.

5.6 Analysis of Voter Welfare

The public benefits most when the socially-optimal choice is implemented. In this paper, voter welfare is measured by the probability that the socially-optimal choice is implemented under each possible pair of actions in equilibrium. We summarize these probabilities in the table below.

Voter Welfare	
Equilibrium Actions	% of Socially-Optimal Policy Implementation
PP	$0.5 + q^2 - q$
LL	r
RR	$1 - r$
GG	$0.5 + r^2 - r$
RL	0
GD	0

As voter welfare is measured according to the number of times the socially-optimal policy is implemented, we find that only coordinated actions from the politicians increase electorate welfare. When both politicians always choose one action regardless of the signals on both the socially-optimal and popular choices, the probability that the socially optimal policy is implemented is given simply by the probability of the action being the socially-optimal choice. Improving the information of politicians on both popular and socially-optimal choices makes it more likely for the socially-optimal policy to be implemented. This may seem counterintuitive for the equilibrium outcome where both politicians pander. However, it is important to note that as the quality of the signal increases, the more likely it is for politicians to coordinate and implement a policy.

When information on the socially-optimal choice is high, the electorate is better off when politicians are good. Although pandering is not ideal, the electorate benefits when the quality of the signal on the popular choice is clear. When neither signal is good, the voter welfare is highest if the politicians happen to choose the state that coincides with the socially-optimal choice.

5.7 Comparative Statics

The strength of the indicator for the socially optimal choice is observed to have a significant impact to the payoffs. The impact of r varies according strategy pairs. In general, any strategy pair that contains any two of the three strategies *Pander*, *Good* and *Destructive.* When the popular choice is unclear, only *Pander* provides constant expected utility with respect to r, regardless of opponent strategy. At very high levels of r, the likelihood of paying pandering costs approaches 0 for $a_i = 0$ (strategy *Left*), and 1 for $a_i = 1$ (strategy *Right*). For polarized strategies L and R, payoffs under $\sigma_i = L$ in general increases with r, and the opposite is observed with $\sigma_i = R$. Effects on expected utilities for *Good* and *Destructive* strategies vary depending on the policy implementation benefit T, the pandering cost c, and the salience of the issue γ. The changes are summarized in the table below:

Changes in Expected Utility given $\uparrow r$		
$EU_1(\sigma_i, \sigma_{-i})$	$q = 0.5$	$q = 1$
$EU_1(P, P)$	no effect	no effect
$EU_1(L, P)$	$\uparrow$	$\uparrow$
$EU_1(R, P)$	$\downarrow$	$\downarrow$
$EU_1(G, P)$	no effect	no effect
$EU_1(D, P)$	no effect	no effect
$EU_1(P, L)$	no effect	$\downarrow$
$EU_1(L, L)$	$\uparrow$	$\uparrow$
$EU_1(R, L)$	$\downarrow$	$\downarrow$
$EU_1(G, L)$	$\uparrow$, $if\, T > \frac{1}{1+\gamma}$	$\uparrow$, $if\, T > \frac{1}{1+\gamma}$
$EU_1(D, L)$	$\uparrow$, $if\, T < \frac{1-c}{1-c+\gamma}$	$\uparrow$, $T < \frac{1-c}{1-c+\gamma}$

Changes in Expected Utility given $\uparrow r$		
$EU_1(\sigma_i, \sigma_{-i})$	$q = 0.5$	$q = 1$
$EU_1(P, R)$	no effect	$\uparrow$
$EU_1(L, R)$	$\uparrow$	$\uparrow$
$EU_1(R, R)$	$\downarrow$	$\downarrow$
$EU_1(G, R)$	$\uparrow, if\, T < \frac{1}{1+\gamma}$	$\uparrow, if\, T < \frac{1}{1+\gamma}$
$EU_1(D, R)$	$\uparrow, if\, T > \frac{1-c}{1-c+\gamma}$	$\uparrow, T > \frac{1-c}{1-c+\gamma}$
$EU_1(P, R)$	no effect	$\uparrow$
$EU_1(L, R)$	$\uparrow$	$\uparrow$
$EU_1(R, R)$	$\downarrow$	$\downarrow$
$EU_1(G, R)$	$\uparrow, if\, T < \frac{1}{1+\gamma}$	$\uparrow, if\, T < \frac{1}{1+\gamma}$
$EU_1(D, R)$	$\uparrow, if\, T > \frac{1-c}{1-c+\gamma}$	$\uparrow, T > \frac{1-c}{1-c+\gamma}$
$EU_1(P, G)$	no effect	no effect
$EU_1(L, G)$	$\uparrow, if\, T > \frac{1-c}{1+\gamma}$	$\uparrow, if\, T > \frac{1-c}{1+\gamma}$
$EU_1(R, G)$	$\uparrow, if\, T < \frac{1-c}{1+\gamma}$	$\uparrow, if\, T < \frac{1-c}{1+\gamma}$
$EU_1(G, G)$	no effect	no effect
$EU_1(D, G)$	no effect	no effect
$EU_1(P, D)$	no effect	no effect
$EU_1(L, D)$	$\uparrow, if\, T < \frac{1}{1-c+\gamma}$	$\uparrow, if\, T < \frac{1}{1-c+\gamma}$
$EU_1(R, D)$	$\uparrow, if\, T > \frac{1}{1-c+\gamma}$	$\uparrow, if\, T > \frac{1}{1-c+\gamma}$
$EU_1(G, D)$	no effect	no effect
$EU_1(D, D)$	no effect	no effect

6 Conclusion

In this paper, two politicians decide on policy actions given the action of their opponenet and their beliefs on both popular and socially optimal choices. The model introduces the idea of relative popularity, wherein the actions of a politician may be perceived better or worse depending on the action of their opponent. Both politicians are uncertain on the popular and socially optimal choices, but receive a signal for both. The public however knows the popular choice, but has no information on the socially optimal choice. Politicians are rewarded when the popular choice is followed. A politician panders by following the popular choice regardless of her information on the socially-optimal state. The public perceives a politician to be pandering when the socially optimal choice is revealed to be different different from the popular choice, and the politician has obtained payoff from the popular choice.

We find that the actions of politicians and the subsequent policy outcomes depend on the quality of the signal on the popular choice and the salience of the issue. When the popular choice is unclear, pandering as a strategy disappears. Uncertainty in public perception leads politicians to take divergent positions to maximize the chance of being identified as the most effective agent. For issues that are non-salient, very high popularity rewards on policy implementation provide politicians incentives to misbehave and implement any policy regardless of public opinion and welfare. For salient issues, however, we find that the only possible outcomes are a divergence of positions for the politicians and the implementation of the socially optimal policy, with the second outcome increasing as the pandering costs increase. Interestingly, the likelihood of each option being the socially optimal choice does not affect the policies implemented in both critical and non-critical issues. The only impact is the type of divergence in positions taken if no agreeement is reached. However, when popular choice is clear, politicians exclusively pander when the issue is salient. For non-salient issues, politicians always implement a policy. The policies vary as the implementation payoffs increase. Salience is not a reliable indicator of when politicians put their constituents best interests in mind. However, politicians place more consideration on what is socially optimal when the demands of the public are not clear. The results indicate that for issues of very high importance the public may sometimes be better off when there is more uncertainty on popular opinion.

The model can be used to understand the behavior of politicians when they can be held directly accountable for their actions. Coalition partnerships can be explored further under this model. The model provides important insights on how and when politicians pander. The results also highlight the importance of issue salience in political accountability.Voters may be able to induce politicians to vote for the socially optimal choice regardless of popular choice if key conditions given the type of issue are met. The paper will be further developed through the introduction of information asymmetry, and multiple issue platforms across one or two periods.

References

Alvarez, R. M. and Franklin, C. H. (1994). Uncertainty and political perceptions. *The Journal of Politics*, 56(3):671–688.

Burstein, P. (2003). The impact of public opinion on public policy: A review and an agenda. *Political Research Quarterly*, 56(1):29–40.

Canes-Wrone, B., Herron, M. C., and Shotts, K. W. (2001). Leadership and pandering: A theory of executive policymaking. *American Journal of Political Science*, 45(3):532–550.

Canovan, M. (1999). Trust the people! populism and the two faces of democracy. *Political Studies*, 47(1):2–16.

Che, Y.-K., Dessein, W., and Kartik, N. (2013). Pandering to persuade. *The American Economic Review*, 103(1):47–79.

Edwards, G. C., Mitchell, W., and Welch, R. (1995). Explaining presidential approval: The significance of issue salience. *American Journal of Political Science*, 39(1):108–134.

Eichorst, J. (2014). Explaining variation in coalition agreements: The electoral and policy motivations for drafting agreements. *European Journal of Political Research*, 53(1):98–115.

Go, A. M. (2016). Incumbent competition and private agenda.

Gratton, G. (2014). Pandering and electoral competition. *Games and Economic Behavior*, 84:163 – 179.

Grossman, G. M. and Helpman, E. (1996). Electoral competition and special interest politics. *The Review of Economic Studies*, 63(2):265–286.

Igielnik, R. and Brown, A. (2017). Key takeaways on americans views of guns and gun ownership.

Isbell, L. M. and Ottati, V. C. (2002). *The Emotional Voter*, pages 55–74. Springer US, Boston, MA.

Jacobs, L. and Shapiro, R. (1997). Debunking the myth of the pandering politician. *The Public Perspective*.

Jacobs, L. and Shapiro, R. (2000). *Politicians don't pander: political manipulation and the loss of democratic responsiveness.* Studies in communication, media, and public opinion. University of Chicago Press, United States. Includes bibliographical references (pages 387-411) and index.

Kartik, N., Squintani, F., and Tinn, K. (2015). Information revelation and pandering in elections.

Krosnick, J. A. and Kinder, D. R. (1990). Altering the foundations of support for the president through priming. *American Political Science Review*, 84(2):497512.

Maskin, E. and Tirole, J. (2014). Pandering and pork-barrel politics.

McGraw, K. M., Lodge, M., and Jones, J. M. (2002). The pandering politicians of suspicious minds. *Journal of Politics*, 64(2):362–383.

Mooney, C. Z. and Lee, M.-H. (2000). The influence of values on consensus and contentious morality policy: U.s. death penalty reform, 195682. *Journal of Politics*, 62(1):223–239.

Morelli, M. and Weelden, R. V. (2013). Ideology and information in policymaking. *Journal of Theoretical Politics*, 25(3):412–439.

Moury, C. (2011). Coalition agreement and party mandate: How coalition agreements constrain the ministers. *Party Politics*, 17(3):385–404.

Page, B. I. and Shapiro, R. Y. (1983). Effects of public opinion on policy. *American Political Science Review*, 77(1):175190.

Price, V., Tewksbury, D., and Powers, E. (1997). Switching trains of thought: The impact of news frames on readers' cognitive responses. *Communication Research*, 24(5):481–506.

Saad, L. (2016). Trump and clinton finish with historically poor images.

Thomson, R. (2001). The programme to policy linkage: The fulfilment of election pledges on socioeconomic policy in the netherlands, 19861998. *European Journal of Political Research*, 40(2):171–197.

Timmermans, A. (2006). Standing apart and sitting together: Enforcing coalition agreements in multiparty systems. *European Journal of Political Research*, 45(2):263–283.

Timpone, R. J. (1998). Structure, behavior, and voter turnout in the united states. *American Political Science Review*, 92(1):145158.

Weaver, D. (1991). Issue Salience and Public Opinion: Are There Consequences of Agenda-Setting? *International Journal of Public Opinion Research*, 3(1):53–68.

A General Expected Utilities

The expected utility of a politician, without, pandering costs, is given by:

$$EU_i(\sigma_i, \sigma_{-i}) = \sum_{\omega \in \Omega} [P(\omega_p = \omega)(T\,P(a_i = \omega)P(a_{-i} = \omega) + P(a_i = \omega)P(a_{-i} \neq \omega) + B\,P(a_i \neq \omega)P(a_{-i} \neq \omega)]$$

Pandering cost is incurred when the popular state is not equal to the socially optimal state. As stated previously, only the payoffs T and 1 can be affected by pandering costs. Taking into account pandering costs, the expected utility of a politician can be written as follows:

$$\begin{aligned} &EU_i(\sigma_i, \sigma_{-i}) = \\ &\quad \sum_{\omega \in \Omega} [P(\omega_p = \omega)[(T\,P(a_i = \omega)P(a_{-i} = \omega) + P(a_i = \omega)P(a_{-i} \neq \omega) + B\,P(a_i \neq \omega)P(a_{-i} \neq \omega)]] - \\ &\quad \sum [cP(\omega^* \neq \omega)P(\omega_p = \omega)(T\,P(a_i = \omega)P(a_{-i} = \omega) + P(a_i = \omega)P(a_{-i} \neq \omega))] \end{aligned}$$

The expected utilities for each possible strategy are outlined below, beginning with *Pander*.

The following probabilities are used in determining $P(\omega^* \neq a_i)$ for the strategy *Pander*:

$$P(\omega^* \neq \omega_p | \theta_i = 0) = q_i + r - 2q_i r$$
$$P(\omega^* \neq \omega_p | \theta_i = 1) = 1 - q_i - r + 2q_i r$$

The Expected Utility for strategy *Pander*, P , is given as follows:

$$\begin{aligned} EU_i(P, \sigma_{-i}) = &\sum [P(\omega_p = \omega)(Tq_i P(a_{-i} = \omega) + q_i P(a_{-i} \neq \omega) + B(1 - q_i)P(a_{-i} \neq \omega)] - \\ &c \sum (P(\omega^* \neq \omega_p | \theta_i = \omega)P(\omega_p = \omega)(Tq_i P(a_{-i} = \omega) + q_i P(a_{-i} \neq \omega))) \end{aligned}$$

For strategy *Left* (L) , the pandering cost is incurred only if the socially optimal decision is not their decision of choice (*i.e.* $\omega^* \neq 0$). Under strategy L, if $\theta_i = 0$,$P(a_i = \omega_p) = q$, and $1 - q$ if $\theta_i = 1$.

The Expected Utility for strategy *Left*, L , is given as follows:

$$EU_i(L,\sigma_{-i}) = \sum [P(\omega_p=\omega)(T\,P(a_i=\omega)P(a_{-i}=\omega)+P(a_i=\omega)P(a_{-i}\neq\omega)+B\,P(a_i\neq\omega)P(a_{-i}\neq\omega)]-$$
$$c(P(\omega^*\neq 0)\sum P(\omega_p=\omega)(T\,P(a_i=\omega)P(a_{-i}=\omega)+P(a_i=\omega)P(a_{-i}\neq\omega)))$$

Under *Right*, the pandering cost is incurred only if the socially optimal decision is not their decision of choice (*i.e.* $\omega^*\neq 1$), the expected utility is given below.

$$EU_i(R,\sigma_{-i}) = \sum [P(\omega_p=\omega)(T\,P(a_i=\omega)P(a_{-i}=\omega)+P(a_i=\omega)P(a_{-i}\neq\omega)+B\,P(a_i\neq\omega)P(a_{-i}\neq\omega)]-$$
$$cP(\omega^*\neq 1)\sum (P(\omega_p=\omega)(T\,P(a_i=\omega)P(a_{-i}=\omega)+P(a_i=\omega)P(a_{-i}\neq\omega)))$$

The remaining strategies *Good*(G) and *Destructive*(D) require the politicians to tailor fit their actions according to what they believe the socially optimal state. For strategy G, if $\omega^*=\omega$, $P(a_i=\omega)=1$, and 0 otherwise. Strategy D results to $P(a_i=\omega)=1$ if $\omega^*\neq\omega$, and 0 otherwise.

The Expected Utilities for strategies G and D, are given as follows:

$$EU_i(G,\sigma_{-i}) = \sum [P(\omega_p=\omega)(P(\omega^*=\omega)(T\,P(a_i=\omega)P(a_{-i}=\omega)+P(a_i=\omega)P(a_{-i}\neq\omega)+$$
$$B\,P(a_i\neq\omega)P(a_{-i}\neq\omega))+P(\omega^*\neq\omega)(T\,P(a_i=\omega)P(a_{-i}=\omega)+$$
$$P(a_i=\omega)P(a_{-i}\neq\omega)+B\,P(a_i\neq\omega)P(a_{-i}\neq\omega))]$$

$$EU_i(D,\sigma_{-i}) = \sum [P(\omega_p=\omega)(P(\omega^*=\omega)(T\,P(a_i=\omega)P(a_{-i}=\omega)+P(a_i=\omega)P(a_{-i}\neq\omega)+$$
$$B\,P(a_i\neq\omega)P(a_{-i}\neq\omega)+P(\omega^*\neq\omega)((1-c)(T\,P(a_i=\omega)P(a_{-i}=\omega)+$$
$$P(a_i=\omega)P(a_{-i}\neq\omega))+B\,P(a_i\neq\omega)P(a_{-i}\neq\omega))]$$

Recall that from Go (2016), *Honest* dominates *Contrarian*. The probability of obtaining each popularity payoff is always higher with *Honest*. The strategy *Pander* is the same as *Honest* in Go (2016) where the popular choice is followed, only with a pandering cost removes a proportion c from the expected utility, the same holds for *Contrarian*. As dominated strategies are removed in the process of obtaining equilibria, we proceed with the computation of expected utilities with the five remaining strategies, $\Sigma_i' = \{P,\ L,\ R,\ G,\ D\}$.

Expected utilities of politician 1 for each strategy profile are computed as outlined above [2]:

$$EU_1(P,P) = q^2(c(0.5\ -0.5T) + T - 1 + \gamma T) + q(1 - 0.5c - 2\gamma T) + \gamma T$$
$$EU_1(L,P) = 0.5(1 - c(1-r))(q(T-1)+1) - 0.5\gamma(q-1)T$$
$$EU_1(R,P) = 0.5(1 - cr)(q(T-1)+1) - 0.5\gamma(q-1)T$$
$$EU_1(G,P) = 0.5q(T - 1 - \gamma T) + 0.5\gamma T + 0.5$$
$$EU_1(D,P) = 0.5c(q(1-T)-1) + 0.5q(T - 1 - \gamma T) + 0.5\gamma T + 0.5$$

$$EU_1(P,L) = 0.5cq(T-1)(q(2r-1)) - 0.5cqTr + 0.5cq(1-r) + 0.5qT + 0.5(\gamma T(1-q)+q)$$
$$EU_1(L,L) = 0.5T(\gamma + 1 - c(1-r))$$
$$EU_1(R,L) = 0.5 - 0.5cr$$
$$EU_1(G,L) = 0.5 + 0.5r((\gamma+1)T - 1)$$
$$EU_1(D,L) = 0.5(\gamma T - r(c + \gamma T - 1)) + 0.5(1-c)(1-r)T$$

$$EU_1(P,R) = 0.5cq(1-T)(2qr - q - r) + 0.5qT(1-c) + 0.5(q + \gamma T(1-q))$$
$$EU_1(L,R) = 0.5c(r-1) + 0.5$$
$$EU_1(R,R) = 0.5T(1 - cr + \gamma)$$
$$EU_1(G,R) = 0.5(r + \gamma T(1-r)) + 0.5(1-r)T$$
$$EU_1(D,R) = 0.5((1-c)(1-r) + \gamma rT) + 0.5(1-c)rT$$

$$EU_1(P,G) = 0.5q(T + 1 - c - \gamma T) + 0.5\gamma T$$

[2] As the game is symmetric, the same values are observed for politician 2 (*e.g.* $EU_1(L,P) = EU_2(P,L)$).

$$EU_1(L,G) = 0.5r(\gamma T + T - 1) - 0.5c(1-r) + 0.5$$

$$EU_1(R,G) = 0.5\gamma(1-r)T + 0.5(r + T(1-r)) - 0.5cr$$

$$EU_1(G,G) = 0.5(\gamma + 1)T$$

$$EU_1(D,G) = 0.5 - 0.5c$$

$$EU_1(P,D) = 0.5q(T(1-c-\gamma) + 1) + 0.5\gamma T$$

$$EU_1(L,D) = 0.5\gamma(1-r)T + 0.5(r + T(1-r)) - 0.5c(1-r)T$$

$$EU_1(R,D) = 0.5r(T(\gamma + 1 - c) - 1) + 0.5$$

$$EU_1(G,D) = 0.5$$

$$EU_1(D,D) = 0.5T(1 - c + \gamma)$$

B Best Responses and Equilibria: $q_i = q_{-i} = 0.5$, $\gamma = 1$

The computation of the best responses of politicians when the popular opinion is unclear on a non-salient issue are shown in full below.

Substituting $q_i = q_{-i} = 0.5$, $\gamma = 1$ to the expected utilities above, the best responses for all possible opponent strategies: $\Sigma_i = \{P, L, R, G, D\}$ are shown in full for politician 1.

σ_i is a best response to $\sigma_{-i} \in \Sigma$, if $EU_i(\sigma_i, \sigma_{-i}) \geq EU_i(\sigma_i', \sigma_{-i})$, $\forall\, \sigma_i' \in \Sigma$.

When $\sigma_{-i} = P$

$$\begin{aligned}
EU_1(P, P) &= -0.125c(T+1) + 0.5T + 0.25 \\
EU_1(L, P) &= 0.25c(r-1)(T+1) + 0.5T + 0.25 \\
EU_1(R, P) &= -0.25cr(T+1) + 0.5T + 0.25 \\
EU_1(G, P) &= 0.5T + 0.25 \\
EU_1(D, P) &= -0.25c(T+1) + 0.5T + 0.25
\end{aligned}$$

Looking at T values where $EU_1(P, P) \geq EU_1(\sigma_i, P)$, where $\sigma_i \neq P$.

$$\begin{aligned}
EU_1(P, P) &\geq EU_1(L, P) \\
-0.125c(T+1) + 0.5T + 0.25 &\geq 0.25c(r-1)(T+1) + 0.5T + 0.25 \\
-0.125c(T+1) &\geq 0.25c(r-1)(T+1) \\
-0.125cT - 0.125c &\geq 0.25crT - 0.25cT + 0.25cr - 0.25c \\
-0.25crT + 0.125cT &\geq 0.25cr - 0.125c \\
Tc(1-2r) &\geq c(2r-1) \\
T &\leq -1
\end{aligned}$$

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(R,P)\\
-0.125c(T+1)+0.5T+0.25 &\geq -0.25cr(T+1)+0.5T+0.25\\
-0.125c(T+1) &\geq -0.25cr(T+1)\\
-0.125cT-0.125c &\geq -0.25crT-0.25cr\\
0.25crT-0.125cT &\geq -0.25cr+0.125c\\
Tc(2r-1) &\geq -c(2r-1)\\
T &> -1
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(G,P)\\
-0.125c(T+1)+0.5T+0.25 &\geq 0.5T+0.25\\
-0.125c(T+1) &\geq 0\\
T+1 &\leq 0\\
T &\leq -1
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(D,P)\\
-0.125c(T+1)+0.5T+0.25 &\geq -0.25c(T+1)+0.5T+0.25\\
-0.125c(T+1) &\geq -0.25c(T+1)\\
0.125cT &\geq -0.125c\\
T &> -1
\end{aligned}
$$

For all possible values of $T \in [0,1]$, expected utilities under *Pander*, $\sigma_i = P$ are always greater than those under strategies *Right* (R) and *Destructive* (D). As T can never negative (*i.e.* in the absence of a socially optimal choice, politicians are not punished for implementing a policy), strategies *Left* (L) and *Good* (G) are more attractive than *Pander*. We obtain the best response for $\sigma_{-i} = P$ by comparing expected utilities for strategies L and G.

$$
\begin{aligned}
EU_1(G,P) &\geq EU_1(L,P) \\
0.5T + 0.25 &\geq 0.25c(r-1)(T+1) + 0.5T + 0.25 \\
0 &\geq 0.25c(r - T + rT - 1) \\
T(1-r) &\geq r - 1 \\
T &\geq -1
\end{aligned}
$$

As $T \in [0,1]$, the strategy *Good* will always be chosen by the politician when the opponent chooses *Pander*.

$$BR_i(P) = G$$

When $\sigma_{-i} = L$

$$
\begin{aligned}
EU_1(P,L) &= -0.125c(T+1) + 0.5T + 0.25 \\
EU_1(L,L) &= 0.5T(2 - c(1-r)) \\
EU_1(R,L) &= 0.5 - 0.5cr \\
EU_1(G,L) &= 0.5 + 0.5r(2T-1) \\
EU_1(D,L) &= 0.5(T - r(c+T-1)) + 0.5(1-c)(1-r)T
\end{aligned}
$$

Finding the conditions for $EU_1(L,L) \geq EU_1(\sigma_i, L)$, where $\sigma_i \neq L$,

$$
\begin{aligned}
EU_1(L,L) &\geq EU_1(P,L) \\
0.5T(2 - c(1-r)) &\geq -0.125c(T+1) + 0.5T + 0.25 \\
0.5T - 0.375cT + 0.5cTr &\geq -0.125c + 0.25 \\
4T - 3cT + 4cTr &\geq -c + 2 \\
T &\geq \frac{2-c}{4 - 3c + 4cr}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(L, L) &\geq EU_1(R, L) \\
0.5T(2 - c(1 - r)) &\geq 0.5 - 0.5cr \\
T(2 - c(1 - r)) &\geq 1 - cr \\
T &\geq \frac{1 - cr}{2 - c + cr}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(L, L) &\geq EU_1(G, L) \\
0.5T(2 - c(1 - r)) &\geq 0.5 + 0.5r(2T - 1) \\
T(2 - c(1 - r)) &\geq 1 - r + 2rT \\
T &\geq \frac{1 - r}{2 - c + cr - 2r} \\
T &\geq \frac{1 - r}{(2 - c)(1 - r)} \\
T &\geq \frac{1}{2 - c}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(L, L) &\geq EU_1(D, L) \\
0.5T(2 - c(1 - r)) &\geq 0.5(T - r(c + T - 1)) + 0.5(1 - c)(1 - r)T \\
T(2 - c(1 - r)) &\geq (T - r(c + T - 1)) + (1 - c)(1 - r)T \\
T(2 - c(1 - r)) - T(1 - r) - (1 - c)(1 - r)T &\geq r(1 - c) \\
T(2 - c(1 - r) - (1 - r) - (1 - c)(1 - r)) &\geq r(1 - c) \\
T(2 - (1 + c)(1 - r) - (1 - c)(1 - r)) &\geq r(1 - c) \\
2rT &\geq r(1 - c) \\
T &\geq \frac{1 - c}{2}
\end{aligned}
$$

Comparing the conditions for $EU_1(L, L) \geq EU_1(G, L) : \frac{1}{2-c}$ **(LN.1)** and $EU_1(L, L) \geq EU_1(P, L) : \frac{2-c}{4-3c+4cr}$ **(LN.2)** [3]:

$$
\begin{aligned}
\textbf{(LN.1)} &\geq \textbf{(LN.2)} \\
\frac{1}{2-c} &\geq \frac{2-c}{4-3c+4cr} \\
4-3c+4cr &\geq (2-c)^2 \\
4-3c+4cr &\geq 4-4c+c^2 \\
1+4r &\geq c
\end{aligned}
$$

For all possible combinations of r and c, condition **(LN.1)** is more stringent than condition **(LN.2)**. When the expected utility of politicians under strategy *Left* exceeds that under *Good*, it follows that the expected utility under *Pander* is also exceeded.

We proceed in a similar manner with the remaining conditions for $EU_1(L, L) \geq EU_1(R, L) : \frac{1-cr}{2-c+cr}$ **(LN.3)**, and $EU_1(L, L) \geq EU_1(D, L) : \frac{1-c}{2}$ **(LN.4)**.

$$
\begin{aligned}
\textbf{(LN.1)} &\geq \textbf{(LN.3)} \\
\frac{1}{2-c} &\geq \frac{1-cr}{2-c+cr} \\
2-c+cr &\geq (1-cr)(2-c) \\
2-c+cr &\geq 2-2cr-c+c^2r \\
r &\geq cr-2r \\
3 &\geq c
\end{aligned}
$$

$$
\begin{aligned}
\textbf{(LN.1)} &\geq \textbf{(LN.4)} \\
\frac{1}{2-c} &\geq \frac{1-c}{2} \\
2 &\geq (1-c)(2-c) \\
2 &\geq 2-3c+c^2 \\
3 &\geq c
\end{aligned}
$$

[3] As $c \in [0, 1]$ and $r \in [\frac{1}{2}, 1]$, both denominators are positive.

The condition for **(LN.1)** is more stringent than both **(LN.3)** and **(LN.4)**. For all $T \geq \frac{1}{2-c}$, L is the best response for $\sigma_{-i} = L$.

From the expected utilities for the remaining strategies, we find the range of values under which $EU_1(G, L)$ is the best response.

$$\begin{aligned}
EU_1(G, L) &\geq EU_1(P, L) \\
0.5 + 0.5r(2T - 1) &\geq -0.125c(T + 1) + 0.5T + 0.25 \\
4 + 8rT - 4r &\geq -cT - c + 4T + 2 \\
8rT + cT - 4T &\geq 4r - c - 2 \\
T &\geq \frac{4r - 2 - c}{8r - 4 + c}
\end{aligned}$$

$$\begin{aligned}
EU_1(G, L) &\geq EU_1(R, L) \\
0.5 + 0.5r(2T - 1) &\geq 0.5 - 0.5cr \\
1 + 2rT - r &\geq 1 - cr \\
T &\geq \frac{1 - c}{2}
\end{aligned}$$

$$\begin{aligned}
EU_1(G, L) &\geq EU_1(D, L) \\
0.5 + 0.5r(2T - 1) &\geq 0.5(T - r(c + T - 1)) + 0.5(1 - c)(1 - r)T \\
1 + 2rT - r &\geq T - cr - rT + r + (1 - c)(1 - r)T \\
3rT - T - (1 - c)(1 - r)T &\geq 2r - cr - 1 \\
T &\geq \frac{2r - cr - 1}{4r - 2 + c - cr}
\end{aligned}$$

Comparing the conditions for $EU_1(G, L) \geq EU_1(P, L) : \frac{4r-2-c}{8r-4+c}$ **(LN.5)** , $EU_1(G, L) \geq EU_1(R, L) : \frac{1-c}{2}$ **(LN.6)**, and $EU_1(G, L) \geq EU_1(D, L) : \frac{2r-cr-1}{4r-2+c-cr}$ **(LN.7)**,

$$\begin{aligned}
\textbf{(LN.5)} &\geq \textbf{(LN.6)} \\
\frac{4r-2-c}{8r-4+c} &\geq \frac{1-c}{2} \\
-2c &\geq 5c - 8rc - c^2 \\
8r &\geq 7 - c \\
r &\geq \frac{7-c}{8}
\end{aligned}$$

$$\begin{aligned}
\textbf{(LN.6)} &\geq \textbf{(LN.7)} \\
\frac{1-c}{2} &\geq \frac{2r-cr-1}{4r-2+c-cr} \\
3r - 3 + c - cr &\geq 0 \\
r &\leq 1
\end{aligned}$$

When r is sufficiently high, **(LN.5)** is more stringent that **(LN.6)**; while for all possible values c and r, satisfying condition**(LN.6)** also satisfies **(LN.7)**. To complete the best response for $\sigma_{-i} = L$, the expected utilities under strategies *Pander*, *Right*, and *Destructive* are also compared.

$$\begin{aligned}
EU_1(P, L) &\geq EU_1(R, L) \\
-0.125c(T+1) + 0.5T + 0.25 &\geq 0.5 - 0.5cr \\
-cT - c + 4T &\geq 2 - 4cr \\
T &\geq \frac{2+c-4cr}{4-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(R, L) &\geq EU_1(D, L) \\
0.5 - 0.5c &\geq 0.5(T - r(c+T-1)) + 0.5(1-c)(1-r)T \\
-(2-c)(1-r)T &\geq -(1-r)(1-c) \\
T &\leq 1 - \frac{1}{2-c}
\end{aligned}$$

Note that $EU_1(D, L)$ exceeds $EU_1(R, L)$ only when T as at least $\frac{1}{2}$, however this expected utility is less than that for strategy G for the same range of values (see comparison for **LN.6** and **LN.7**), leaving strategy R the only viable option for $T \leq \frac{2+c-4cr}{4-c}$. Putting all the above conditions together, the best response function for $\sigma_{-i} = L$ is given as follows:

If $r \geq \frac{7-c}{8}$:

$$BR_i(L) = \begin{cases} L & if\, T \geq \frac{1}{2-c}, \\ G & if\, \frac{4r-2-c}{8r-4+c} \leq T < \frac{1}{2-c} \\ P & if\, \frac{2+c-4cr}{4-c} \leq T < \frac{4r-2-c}{8r-4+c} \\ R & if\, T < \frac{2+c-4cr}{4-c}, \end{cases}$$

Otherwise,

$$BR_i(L) = \begin{cases} L & if\, T \geq \frac{1}{2-c}, \\ G & if\, \frac{1-c}{2} \leq T < \frac{1}{2-c} \\ R & if\, T < \frac{1-c}{2}, \end{cases}$$

When $\sigma_{-i} = R$

$$\begin{aligned} EU_1(P, R) &= -0.125c(T + 1) + 0.5T + 0.25 \\ EU_1(L, R) &= 0.5c(r - 1) + 0.5 \\ EU_1(R, R) &= 0.5T(2 - cr) \\ EU_1(G, R) &= 0.5r + T(1 - r) \\ EU_1(D, R) &= 0.5((1 - c)(1 - r) + rT) + 0.5(1 - c)rT \end{aligned}$$

Finding the conditions for $EU_1(R, R) \geq EU_1(\sigma_i,\, R)$, where $\sigma_i \neq R$,

$$\begin{aligned} EU_1(R, R) &\geq EU_1(P, R) \\ 0.5T(2 - cr) &\geq -0.125c(T + 1) + 0.5T + 0.25 \\ 8T - 4crT &\geq -cT - c + 4T + 2 \\ T &\geq \frac{2 - c}{4 + c - 4cr} \end{aligned}$$

$$\begin{aligned}
EU_1(R,R) &\geq EU_1(L,R) \\
0.5T(2-cr) &\geq 0.5c(r-1)+0.5 \\
T(2-cr) &\geq cr-c+1 \\
T &\geq \frac{cr-c+1}{2-cr}
\end{aligned}$$

$$\begin{aligned}
EU_1(R,R) &\geq EU_1(G,R) \\
0.5T(2-cr) &\geq 0.5r+T(1-r) \\
T(2-cr)-T(2-2r) &\geq r \\
T &\geq \frac{1}{2-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(R,R) &\geq EU_1(D,R) \\
0.5T(2-cr) &\geq 0.5((1-c)(1-r)+rT)+0.5(1-c)rT \\
T(2-cr) &\geq (1-c)(1-r)+rT+(1-c)rT \\
T(2-2r) &\geq (1-c)(1-r) \\
T &\geq \frac{(1-c)}{2}
\end{aligned}$$

Comparing the conditions for $EU_1(R,R) \geq EU_1(P,R) : \frac{2-c}{4+c-4cr}$ **(RN.1)**, $EU_1(R,R) \geq EU_1(L,R) : \frac{cr-c+1}{2-cr}$ **(RN.2)**, $EU_1(R,R) \geq EU_1(G,R) : \frac{1}{2-c}$ **(RN.3)**, and $EU_1(R,R) \geq EU_1(D,R) : \frac{(1-c)}{2}$ **(RN.4)**,

$$\begin{aligned}
\textbf{(RN.3)} &\geq \textbf{(RN.1)} \\
\frac{1}{2-c} &\geq \frac{2-c}{4+c-4cr} \\
4+c-4cr &\geq 4-4c+c^2 \\
4cr &\geq -5c+c^2 \\
r &> \frac{c-5}{4}
\end{aligned}$$

$$\textbf{(RN.3)} \geq \textbf{(RN.2)}$$

$$\begin{aligned}
\frac{1}{2-c} &\geq \frac{cr-c+1}{2-cr} \\
c^2r - 3cr &\geq -3c + c^2 \\
r &\leq 1
\end{aligned}$$

$$\begin{aligned}
\textbf{(RN.3)} &\geq \textbf{(RN.4)} \\
\frac{1}{2-c} &\geq \frac{(1-c)}{2} \\
2 &\geq (1-c)(2-c)
\end{aligned}$$

As r is always positive, and is between $\frac{1}{2}$ and 1, any T that satisfies the condition for $EU_1(R,R) \geq EU_1(G,R)$ also satisfies conditions **RN.1, RN.2, RN.4**. For $T \geq \frac{1}{2-c}$, the best response for $\sigma_{-i} = R$ is R.

Comparing the remaining expected utilities, we find the best responses for the remaining range of T values.

$$\begin{aligned}
EU_1(G,R) &\geq EU_1(P,R) \\
0.5r + T(1-r) &\geq -0.125c(T+1) + 0.5T + 0.25 \\
4T - 8rT + cT &\geq -c + 2 - 4r \\
T &< \frac{2-4r-c}{4-8r+c}
\end{aligned}$$

$$\begin{aligned}
EU_1(G,R) &\geq EU_1(L,R) \\
0.5r + T(1-r) &\geq 0.5c(r-1) + 0.5 \\
T &\geq \frac{1-c}{2}
\end{aligned}$$

$$\begin{aligned}
EU_1(G,R) &\geq EU_1(D,R) \\
0.5r + T(1-r) &\geq 0.5((1-c)(1-r) + rT) + 0.5(1-c)rT \\
(2-4r+cr)T &\geq 1 - c - 2r + cr \\
T &\geq \frac{1-c-2r+cr}{2-4r+cr}
\end{aligned}$$

The conditions for $EU_1(G,R) \geq EU_1(P,R) : \frac{2-4r-c}{4-8r+c}$ **(RN.5)**, $EU_1(G,R) \geq EU_1(L,R) :$ $\frac{1-c}{2}$ **(RN.6)**, and $EU_1(G,R) \geq EU_1(D,R) : \frac{1-c-2r+cr}{2-4r+cr}$ **(RN.7)** are compared to find the range of T values where $\sigma_i = G$ is the best responses.

$$\begin{aligned}
\textbf{(RN.5)} &\leq \textbf{(RN.6)} \\
\frac{2-4r-c}{4-8r+c} &\leq \frac{1-c}{2} \\
4-8r-2c &\leq 4-8r+c-4c+8cr-c^2 \\
c &\leq 8cr-c^2 \\
r &\geq \frac{1+c}{8}
\end{aligned}$$

$$\begin{aligned}
\textbf{(RN.6)} &\geq \textbf{(RN.7)} \\
\frac{1-c}{2} &\geq \frac{1-c-2r+cr}{2-4r+cr} \\
2-4r+cr-2c+4cr-c^2r &\geq 2-2c-4r+2cr \\
3cr-c^2r &\geq 0 \\
r &\geq 0
\end{aligned}$$

As $r \in [\frac{1}{2}, 1]$, for $\frac{1-c}{2} \leq T \leq \frac{1}{2-c}$ the best response for $\sigma_{-i} = G$ is G.

Comparing the remaining expected utilities, and the threshold conditions,

$$\begin{aligned}
EU_1(L,R) &\geq EU_1(P,R) \\
0.5c(r-1)+0.5 &\geq -0.125c(T+1)+0.5T+0.25 \\
(c-4)T &\geq 3c-2-4cr \\
T &\leq \frac{2-3c+4cr}{4-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(L,R) &\geq EU_1(D,R) \\
0.5c(r-1)+0.5 &\geq 0.5((1-c)(1-r)+rT)+0.5(1-c)rT \\
cr-c+1 &\geq (1-c)(1-r)+rT+(1-c)rT \\
0 &\geq -r+(2-c)rT
\end{aligned}$$

$$T \leq \frac{1}{2-c}$$

Recall that $EU_1(G,R) \geq EU_1(L,R) : \frac{1-c}{2}$ **(RN.6)**; We compare this to the threshold conditions of $EU_1(L,R) \geq EU_1(P,R) : \frac{2-3c+4cr}{4-c}$ **(RN.8)** and $EU_1(L,R) \geq EU_1(D,R) : \frac{1}{2-c}$ **(RN.9)** ,

$$\begin{aligned}
\textbf{(RN.6)} &\leq \textbf{(RN.8)} \\
\frac{1-c}{2} &\leq \frac{2-3c+4cr}{4-c} \\
-5c+c^2 &\leq -6c+8cr \\
-8r &\leq -1-c \\
r &\geq \frac{1+c}{8}
\end{aligned}$$

$$\begin{aligned}
\textbf{(RN.6)} &\leq \textbf{(RN.9)} \\
\frac{1-c}{2} &\leq \frac{1}{2-c} \\
2-3c+c^2 &\leq 2 \\
-3+c &\leq 0 \\
r &\leq 3
\end{aligned}$$

The condition **(RN.6)** is more stringent than both **(RN.8)** and **(RN.9)**.

From this, the best responses for $\sigma_{-i} = R$ can be shown in full below:

$$BR_i(R) = \begin{cases} R & if\, T \geq \frac{1}{2-c}, \\ G & if\, \frac{1-c}{2} \leq T < \frac{1}{2-c} \\ L & if\, T < \frac{1-c}{2} \end{cases}$$

When $\sigma_{-i} = G$

$$
\begin{aligned}
EU_1(P, G) &= 0.25 - 0.25c + 0.5T \\
EU_1(L, G) &= 0.5c(r-1) + 0.5r(2T-1) + 0.5 \\
EU_1(R, G) &= 0.5r(1-c-2T) + T \\
EU_1(G, G) &= T \\
EU_1(D, G) &= 0.5 - 0.5c
\end{aligned}
$$

Looking at T values where $EU_1(G, G) \geq EU_1(\sigma_i, G)$, where $\sigma_i \neq G$.

$$
\begin{aligned}
EU_1(G, G) &\geq EU_1(P, G) \\
T &\geq 0.25 - 0.25c + 0.5T \\
0.5T &\geq 0.25 - 0.25c \\
T &\geq \frac{1-c}{2}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(G, G) &\geq EU_1(L, G) \\
T &\geq 0.5c(r-1) + 0.5r(2T-1) + 0.5 \\
T(1-r) &\geq 0.5(1-r)(1-c) \\
T &\geq \frac{1-c}{2}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(G, G) &\geq EU_1(R, G) \\
T &\geq 0.5r(1-c-2T) + T \\
rT &\geq 0.5r - 0.5cr \\
T &\geq \frac{1-c}{2}
\end{aligned}
$$

$$
EU_1(G, G) \geq EU_1(D, G)
$$

$$T \geq \frac{1-c}{2}$$

When $T \geq \frac{1-c}{2}$, the best response for $\sigma_{-i} = G$ is G.

We compare the expected utilities for the remaining strategies to determine the best response for $T \leq \frac{1-c}{2}$

$$\begin{aligned} EU_1(D, G) &\geq EU_1(P, G) \\ \frac{1-c}{2} &\geq 0.25 - 0.25c + 0.5T \\ -T &\geq -0.5 + 0.5c \\ T &\leq \frac{1-c}{2} \end{aligned}$$

$$\begin{aligned} EU_1(D, G) &\geq EU_1(L, G) \\ \frac{1-c}{2} &\geq 0.5c(r-1) + 0.5r(2T-1) + 0.5 \\ 1-c &\geq c(r-1) + 2rT + 1 - r \\ -2rT &\geq -(1-c)r \\ T &\leq \frac{1-c}{2} \end{aligned}$$

$$\begin{aligned} EU_1(D, G) &\geq EU_1(R, G) \\ \frac{1-c}{2} &\geq 0.5r(1-c-2T) + T \\ 1-c &\geq r - cr - 2rT + 2T \\ (2r-2)T &\geq (r-1)(1-c) \\ T &\leq \frac{1-c}{2} \end{aligned}$$

The best response function for $\sigma_{-i} = R$ is shown in full below:

$$BR_i(G) = \begin{cases} G & if\, T \geq \frac{1-c}{2}, \\ D & otherwise. \end{cases}$$

When $\sigma_{-i} = D$

$$\begin{aligned}
EU_1(P, D) &= 0.25T(2-c) + 0.25 \\
EU_1(L, D) &= 0.5(1-c)(1-r)T + 0.5(r + T(1-r)) \\
EU_1(R, D) &= 0.5r(T(2-c) - 1) + 0.5 \\
EU_1(G, D) &= 0.5 \\
EU_1(D, D) &= 0.5T(2-c)
\end{aligned}$$

We begin with looking at T values where $EU_1(D, D) \geq EU_1(\sigma_i, D)$, where $\sigma_i \neq D$.

$$\begin{aligned}
EU_1(D, D) &\geq EU_1(P, D) \\
0.5T(2-c) &\geq 0.25T(2-c) + 0.25 \\
2T - cT &\geq 1 \\
T &\geq \frac{1}{2-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(D, D) &\geq EU_1(L, D) \\
0.5T(2-c) &\geq 0.5(1-c)(1-r)T + 0.5(r + T(1-r)) \\
(2-c)(r)T &\geq r \\
T &\geq \frac{1}{2-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(D, D) &\geq EU_1(R, D) \\
0.5T(2-c) &\geq 0.5r(T(2-c) - 1) + 0.5 \\
(1-r)(2-c)T &\geq 1 - r
\end{aligned}$$

$$T \geq \frac{1}{2-c}$$

$$\begin{aligned} EU_1(D,D) &\geq EU_1(G,D) \\ 0.5T(2-c) &\geq 0.5 \\ T &\geq \frac{1}{2-c} \end{aligned}$$

From the above, the best response for $\sigma_{-i} = D$ when $T \geq \frac{1}{2-c}$ is D. For $T \leq \frac{1}{2-c}$, the expected utilities from the remaining strategies are compared:

$$\begin{aligned} EU_1(G,D) &\geq EU_1(P,D) \\ 0.5 &\geq 0.25T(2-c) + 0.25 \\ 1 &\geq T(2-c) \\ T &\leq \frac{1}{2-c} \end{aligned}$$

$$\begin{aligned} EU_1(G,D) &\geq EU_1(L,D) \\ 0.5 &\geq 0.5(1-c)(1-r)T + 0.5(r + T(1-r)) \\ 1-r &\geq (2-c)(1-r)T \\ T &\leq \frac{1}{2-c} \end{aligned}$$

$$\begin{aligned} EU_1(G,D) &\geq EU_1(R,D) \\ 0.5 &\geq 0.5r(T(2-c)-1) + 0.5 \\ 0 &\geq r(T(2-c)-1) \\ T &\leq \frac{1}{2-c} \end{aligned}$$

When $T \leq \frac{1}{2-c}$, G is the best response. The best responses for $\sigma_{-i} = D$ is summarized below:

$$BR_i(D) = \begin{cases} D & if\, T \geq \frac{1}{2-c}, \\ G & otherwise. \end{cases}$$

B.1 Equilibria

The pure-strategy Bayesian Nash Equilibria for the game is computed from the best responses above.

$s^* = (\sigma_1^*, \sigma_2^*) \in S$ is a Bayesian Nash Equilibrium if $\sigma_i^* \in B_i(\sigma_{-i}^*)$ for every $i \in I$.

From the best responses above, mutual best responses are calculated. We find that for sufficiently large policy payoffs, $T \geq \frac{1}{2-c}$, politicians pool in equilibria with the exception of strategy *Pander*. P is not an equilibrium strategy when $q = 0.5$. For moderate policy payoffs, $\frac{1}{2} - \frac{1}{2}c \leq T < \frac{1}{2-c}$, politicians implement the socially optimal policy. Otherwise, politicians choose contrasting strategies. The equilibria is summarized in *Proposition 1* below.

Proposition 1

When the popular choice is unclear ($q_i = q_{-i} = \frac{1}{2}$) and the issue is non-salient ($\gamma = 1$),

1. If $T \geq \frac{1}{2-c}$, there exist only four possible equilibria (L,L), (R,R), (G,G), or (D,D),

2. If $\frac{1}{2} - \frac{1}{2}c \leq T < \frac{1}{2-c}$, there exists a unique equilibrium (G,G),

3. If $\frac{2+c-4cr}{4-c} \leq T < \frac{1}{2} - \frac{1}{2}c$, there exists only two possible equilibria (G,D) or (D,G),

4. If $T < \frac{1}{2} - \frac{1}{2}c$ and $T < \frac{2+c-4cr}{4-c}$, there exist only four possible equilibria (R,L), (L,R), (G,D), and (D,G).

C Best Responses and Equilibria: $q_i = q_{-i} = 0.5$, $\gamma = 0$

The computation of the best responses of politicians when the popular opinion is unclear on a salient issue are shown in full below.

σ_i is a best response to $\sigma_{-i} \in \Sigma$, if $EU_i(\sigma_i, \sigma_{-i}) \geq EU_i(\sigma_i', \sigma_{-i})$, $\forall\, \sigma_i' \in \Sigma$.

When $\sigma_{-i} = P$

$$
\begin{aligned}
EU_1(P,P) &= -0.125c(T+1) + 0.25T + 0.25 \\
EU_1(L,P) &= 0.25c(r-1)(T+1) + 0.25T + 0.25 \\
EU_1(R,P) &= -0.25cr(T+1) + 0.25T + 0.25 \\
EU_1(G,P) &= 0.25T + 0.25 \\
EU_1(D,P) &= -0.25c(T+1) + 0.25T + 0.25
\end{aligned}
$$

Looking at T values where $EU_1(P,P) \geq EU_1(\sigma_i, P)$, where $\sigma_i \neq P$.

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(L,P) \\
-0.125c(T+1) + 0.25T + 0.25 &\geq 0.25c(r-1)(T+1) + 0.25T + 0.25 \\
Tc(1-2r) &\geq c(2r-1) \\
T &\leq -1
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(R,P) \\
-0.125c(T+1) + 0.25T + 0.25 &\geq -0.25cr(T+1) + 0.25T + 0.25 \\
Tc(2r-1) &\geq -c(2r-1) \\
T &> -1
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(G,P) \\
-0.125c(T+1) + 0.25T + 0.25 &\geq 0.25T + 0.25
\end{aligned}
$$

$$
\begin{aligned}
-0.125c(T+1) &\geq 0 \\
T &\leq -1
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(D,P) \\
-0.125c(T+1) + 0.25T + 0.25 &\geq -0.25c(T+1) + 0.25T + 0.25 \\
-0.125c(T+1) &\geq -0.25c(T+1) \\
0.125cT &\geq -0.125c \\
T &> -1
\end{aligned}
$$

As with non-salient issues, for all possible values of $T \in [0,1]$, expected utilities under *Pander*, $\sigma_i = P$ are always greater than those under strategies *Right* (R) and *Destructive* (D). As T is always nonnegative, strategies *Left* (L) and *Good* (G) are more attractive than *Pander*. We obtain the best response for $\sigma_{-i} = P$ by comparing expected utilities for strategies L and G.

$$
\begin{aligned}
EU_1(G,P) &\geq EU_1(L,P) \\
0.25T + 0.25 &\geq 0.25c(r-1)(T+1) + 0.25T + 0.25 \\
0 &\geq 0.25c(r - T + rT - 1) \\
T(1-r) &\geq r - 1 \\
T &\geq -1
\end{aligned}
$$

As $T \in [0,1]$, the strategy *Good* will always be chosen by the politician when the opponent chooses *Pander*.

$$BR_i(P) = G$$

When $\sigma_{-i} = L$

$$\begin{aligned}
EU_1(P, L) &= -0.125c(T+1) + 0.25T + 0.25 \\
EU_1(L, L) &= 0.5T(1 - c(1-r)) \\
EU_1(R, L) &= 0.5 - 0.5cr \\
EU_1(G, L) &= 0.5 + 0.5r(T-1) \\
EU_1(D, L) &= 0.5(1-c)((1-r)T + r)
\end{aligned}$$

Finding the conditions for $EU_1(L, L) \geq EU_1(\sigma_i, L)$, where $\sigma_i \neq L$,

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(P, L) \\
0.5T(1 - c(1-r)) &\geq -0.125c(T+1) + 0.25T + 0.25 \\
T &\geq \frac{2-c}{2 - 3c + 4cr}
\end{aligned}$$

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(R, L) \\
0.5T(1 - c(1-r)) &\geq 0.5 - 0.5cr \\
T &\geq \frac{1-cr}{1 - c + cr}
\end{aligned}$$

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(G, L) \\
0.5T(1 - c(1-r)) &\geq 0.5 + 0.5r(T-1) \\
T(1-c)(1-r) &\geq 1 - r \\
T &\geq \frac{1}{1-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(D, L) \\
0.5T(1 - c(1-r)) &\geq 0.5(1-c)((1-r)T + r) \\
T(1 - c(1-r) - (1-c)(1-r)) &\geq (1-c)r \\
T &\geq 1 - c
\end{aligned}$$

Note that although $\sigma_i = L$ provides larger expected utility values in comparison to strategies R and D when $T \geq 1 - c$, strategy *Good* will always provide a higher payoff than *Left* as $T \leq 1$.

Comparing expected utilities for strategies *Right*, *Destructive*, and *Good*, we find the range of values under which $EU_1(G, L)$ is the best response.

$$\begin{aligned}
EU_1(G, L) &\geq EU_1(D, L) \\
0.5 + 0.5r(T - 1) &\geq 0.5(1 - c)((1 - r)T + r) \\
T(2r - 1 + c - cr) &\geq 2r - cr - 1 \\
T &\geq \frac{2r - cr - 1}{2r - 1 + c - cr}
\end{aligned}$$

$$\begin{aligned}
EU_1(G, L) &\geq EU_1(R, L) \\
0.5 + 0.5r(T - 1) &\geq 0.5 - 0.5cr \\
1 + rT - r &\geq 1 - cr \\
T &\geq 1 - c
\end{aligned}$$

$$\begin{aligned}
EU_1(R, L) &\geq EU_1(D, L) \\
0.5 - 0.5cr &\geq 0.5(1 - c)((1 - r)T + r) \\
(1 - c)(1 - r)T &\leq 1 - r \\
T &\leq \frac{1}{1 - c}
\end{aligned}$$

$$\begin{aligned}
EU_1(G, L) &\geq EU_1(P, L) \\
0.5 + 0.5r(T - 1) &\geq -0.125c(T + 1) + 0.25T + 0.25 \\
4 + 4rT - 4r &\geq -cT - c + 2T + 2 \\
4rT + cT - 2T &\geq 4r - c - 2 \\
T &\geq \frac{4r - 2 - c}{4r - 2 + c}
\end{aligned}$$

As the maximum T value is 1, $T \leq \frac{1}{1-c}$, expected utility under R is always higher than D for $\sigma_{-i} = L$. For all $T \geq 1 - c$ and $T \geq \frac{4r-2-c}{4r-2+c}$, G is the best response for $\sigma_{-i} = L$.

To complete the best response for $\sigma_{-i} = L$, the expected utilities under strategies *Pander*, *Right*, and *Destructive* are also compared.

$$\begin{aligned}
EU_1(P, L) &\geq EU_1(R, L) \\
-0.125c(T + 1) + 0.25T + 0.25 &\geq 0.5 - 0.5cr \\
-cT - c + 2T &\geq 2 - 4cr \\
T &\geq \frac{2 + c - 4cr}{2 - c}
\end{aligned}$$

$$\begin{aligned}
EU_1(P, L) &\geq EU_1(D, L) \\
-0.125c(T + 1) + 0.25T + 0.25 &\geq 0.5(1 - c)(T(1 - r) + r) \\
T(-2 + 3c + 4r - 4cr) &\geq 4r - 4cr - 2 + c \\
T &\geq \frac{2 - c - 4r + 4cr}{2 - 3c - 4r + 4cr}
\end{aligned}$$

$$\begin{aligned}
EU_1(R, L) &\geq EU_1(D, L) \\
0.5 - 0.5cr &\geq 0.5(1 - c)(T(1 - r) + r) \\
-T(1 - c)(1 - r) &\geq -1 + r \\
T &\leq \frac{1}{1 - c}
\end{aligned}$$

From the above, when $\frac{2+c-4cr}{2-c} \geq T < \frac{4r-2-c}{4r-2+c}$, P is the best resposnes. Recall that for $T \leq 1 - c$, $EU_1(R, L) \geq EU_1(L, L)$. When $T \leq 1 - c$ and $T \leq \frac{2+c-4cr}{2-c}$, R is the best response.

$$BR_i(L) = \begin{cases} G & if\, T \geq 1 - c\, and\, T \geq \frac{4r-2-c}{4r-2+c}, \\ P & if\, \frac{2+c-4cr}{2-c} \geq T < \frac{4r-2-c}{4r-2+c}, \\ R & if\, T < 1 - c\, and\, T < \frac{2+c-4cr}{2-c}, \end{cases}$$

When $\sigma_{-i} = R$

$$\begin{aligned}
EU_1(P, R) &= -0.125c(T + 1) + 0.25T + 0.25 \\
EU_1(L, R) &= 0.5c(r - 1) + 0.5
\end{aligned}$$

$$
\begin{aligned}
EU_1(R,R) &= 0.5T(1-cr)\\
EU_1(G,R) &= 0.5r + 0.5(1-r)T\\
EU_1(D,R) &= 0.5(1-c)(1-r(1-T))
\end{aligned}
$$

Finding the conditions for $EU_1(R,R) \geq EU_1(\sigma_i, R)$, where $\sigma_i \neq R$,

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(P,R)\\
0.5T(1-cr) &\geq -0.125c(T+1) + 0.25T + 0.25\\
T(2-4cr+c) &\geq 2-c\\
T &\geq \frac{2-c}{2+c-4cr}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(L,R)\\
0.5T(1-cr) &\geq 0.5c(r-1) + 0.5\\
T &\geq \frac{1+cr-c}{1-cr}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(G,R)\\
0.5T(1-cr) &\geq 0.5r + 0.5(1-r)T\\
Tr(1-c) &\geq r\\
T &\geq \frac{1}{1-c}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(D,R)\\
0.5T(1-cr) &\geq 0.5(1-c)(1-r+rT))\\
T(1-r) &\geq (1-c)(1-r)\\
T &\geq (1-c)
\end{aligned}
$$

As $T \in [0,1]$, $EU_1(G,R)$ is always greater than $EU_1(R,R)$. $EU_1(R,R)$ is greater than both $EU_1(D,R)$ and $EU_1(L,R)$ when it satisfies the condition for $T \geq \frac{1+cr-c}{1-cr}$. To find the T interval where G is the best response, we compare expected utilities under L and D to that of G.

$$\begin{aligned}
EU_1(G,R) &\geq EU_1(L,R)\\
0.5r + 0.5(1-r)T &\geq 0.5c(r-1) + 0.5\\
(1-r)T &\geq cr - c + 1 - r\\
T &\geq 1 - c
\end{aligned}$$

$$\begin{aligned}
EU_1(G,R) &\geq EU_1(D,R)\\
0.5r + 0.5(1-r)T &\geq 0.5(1-c)(1-r+rT))\\
T(1-2r+cr) &\geq (1-c)(1-r)\\
T &\geq \frac{1-c-2r+cr}{1-2r+cr}
\end{aligned}$$

$$\begin{aligned}
EU_1(G,R) &\geq EU_1(P,R)\\
0.5r + 0.5(1-r)T &\geq -0.125c(T+1) + 0.25T + 0.25\\
T &\geq \frac{2-c-4r}{2+c-4r}
\end{aligned}$$

Comparing the conditions for $EU_1(G,R) \geq EU_1(L,R) : 1-c$ **RS.1** and $EU_1(G,R) \geq EU_1(P,R) : \frac{2-c-4r}{2+c-4r}$ **RS.2** to see which one is more stringent,

$$\begin{aligned}
\mathbf{RS.1} &\geq \mathbf{RS.2}\\
1-c &\geq \frac{2-c-4r}{2+c-4r}\\
-c^2 + 4cr &\geq 0\\
r &\geq \frac{c}{4}
\end{aligned}$$

As $r \geq \frac{1}{2}$ and $c \in [0,1]$, the condition **RS.1** is more stringent. If $EU_1(G,R) \geq EU_1(L,R)$, then $EU_1(G,R) \geq EU_1(P,R)$.

The best response for $\sigma_{-i} = R$ is G when $T \geq 1-c$.

From the expected utilities of the remaining strategies, we find the remaining conditions to complete the best response function.

$$\begin{aligned}
EU_1(L,R) &\geq EU_1(D,R) \\
0.5c(r-1)+0.5 &\geq 0.5(1-c)(1-r+rT)) \\
cr-c+1 &\geq (1-c)(1-r)+(1-c)rT \\
T &\leq \frac{1}{1-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(L,R) &\geq EU_1(P,R) \\
0.5c(r-1)+0.5 &\geq -0.125c(T+1)+0.25T+0.25 \\
4cr-3c+2 &\geq -cT+2T \\
T &\leq \frac{4cr-3c+2}{2-c}
\end{aligned}$$

Comparing the conditions for $EU_1(L,R) \geq EU_1(P,R) : \frac{4cr-3c+2}{2-c}$ **RS.3** and **RS.1**, the more stringent condition, that is the lower threshold, determines the range of values for T

$$\begin{aligned}
\textbf{RS.1} &\leq \textbf{RS.3} \\
1-c &\leq \frac{4cr-3c+2}{2-c} \\
c^2 &\leq 4cr \\
r &\geq \frac{c}{4}
\end{aligned}$$

As r is always greater than $\frac{c}{4}$, $\sigma_i = L$ is the best response for $\sigma_{-i} = R$ when $T < 1-c$

The best response function for $\sigma_{-i} = R$ is given as follows

$$BR_i(R) = \begin{cases} G & if\, T \geq 1-c, \\ L & if\, T < 1-c. \end{cases}$$

When $\sigma_{-i} = G$

$$
\begin{aligned}
EU_1(P, G) &= -0.25c + 0.25T + 0.25 \\
EU_1(L, G) &= 0.5c(r-1) + 0.5r(T-1) + 0.5 \\
EU_1(R, G) &= -0.5cr + 0.5(r + T(1-r)) \\
EU_1(G, G) &= 0.5T \\
EU_1(D, G) &= 0.5 - 0.5c
\end{aligned}
$$

Finding the conditions for $EU_1(G, G) \geq EU_1(\sigma_i, G)$, where $\sigma_i \neq G$,

$$
\begin{aligned}
EU_1(G, G) &\geq EU_1(P, G) \\
0.5T &\geq -0.25c + 0.25T + 0.25 \\
2T &\geq -c + T + 1 \\
T &\geq 1 - c
\end{aligned}
$$

$$
\begin{aligned}
EU_1(G, G) &\geq EU_1(L, G) \\
0.5T &\geq 0.5c(r-1) + 0.5r(T-1) + 0.5 \\
(1-r)T &\geq (1-r)(1-c) \\
T &\geq 1 - c
\end{aligned}
$$

$$
\begin{aligned}
EU_1(G, G) &\geq EU_1(R, G) \\
0.5T &\geq -0.5cr + 0.5(r + T(1-r)) \\
rT &\geq -cr + r \\
T &\geq 1 - c
\end{aligned}
$$

$$
\begin{aligned}
EU_1(G, G) &\geq EU_1(D, G) \\
0.5T &\geq 0.5 - 0.5c \\
T &\geq 1 - c
\end{aligned}
$$

When $T \geq 1 - c$, $\sigma_i = G$ is the best response for $\sigma_{-i} = G$. Comparing the expected utilities of the remaining strategies,

$$\begin{aligned}
EU_1(D,G) &\geq EU_1(P,G) \\
0.5 - 0.5c &\geq -0.25c + 0.25T + 0.25 \\
2 &\geq T + 1 \\
T &< 1
\end{aligned}$$

$$\begin{aligned}
EU_1(D,G) &\geq EU_1(L,G) \\
0.5 - 0.5c &\geq 0.5c(r-1) + 0.5r(T-1) + 0.5 \\
r(1-c) &\geq rT \\
T &< 1-c
\end{aligned}$$

$$\begin{aligned}
EU_1(D,G) &\geq EU_1(R,G) \\
0.5 - 0.5c &\geq -0.5cr + 0.5(r + T(1-r)) \\
1 - c &\geq -cr + r + (1-r)T \\
T &< 1-c
\end{aligned}$$

When $T < 1 - c$, D provides the highest expected utility. The best response function for $\sigma_{-i} = G$ is given as follows

$$BR_i(G) = \begin{cases} G & if\, T \geq 1-c, \\ D & if\, T < 1-c. \end{cases}$$

When $\sigma_{-i} = D$

$$\begin{aligned}
EU_1(P,D) &= 0.25T(1-c) + 0.25 \\
EU_1(L,D) &= 0.5c(r-1)T + 0.5(r + T(1-r)) \\
EU_1(R,D) &= 0.5r(T(1-c) - 1) + 0.5 \\
EU_1(G,D) &= 0.5 \\
EU_1(D,D) &= 0.5T(1-c)
\end{aligned}$$

From the above, for all possible combinations of T, r and c , G provides the highest expected utility.

$$BR_i(D) = G$$

C.1 Equilibria

The pure-strategy Bayesian Nash Equilibria for the game is computed from the best responses above.

$s^* = (\sigma_1^*, \sigma_2^*) \in S$ is a Bayesian Nash Equilibrium if $\sigma_i^* \in B_i(\sigma_{-i}^*)$ for every $i \in I$.

From the best responses above, mutual best responses are calculated. We find that for sufficiently large policy payoffs, $T \geq 1-c$, only the socially optimal policy is implemented. For lower levels of policy benefit, politicians diverge strategically, choosing contrasting strategies. The equilibria is summarized in *Proposition 2* below.

Proposition 2

When the popular choice is unclear ($q_i = q_{-i} = \frac{1}{2}$) and the issue is salient ($\gamma = 0$),

1. If $T \geq 1 - c$, there exists a unique equilibrium (G,G),

2. If $\frac{2+c-4cr}{2-c} \leq T < 1 - c$, there exists only two possible equilibria (G,D) or (D,G),

3. If $T < 1 - c$ and $T < \frac{2+c-4cr}{2-c}$, there exists only four possible equilibria (R,L), (L,R), (G,D) or (D,G).

D Best Responses and Equilibria: $q_i = q_{-i} = 1$, $\gamma = 1$

The computation of the best responses of politicians when the popular opinion is clear on a non-salient issue are shown in full below.

Substituting $q_i = q_{-i} = 1$, $\gamma = 1$ to the expected utilities above, the best responses for all possible opponent strategies: $\Sigma_i = \{P, L, R, G, D\}$ are shown in full for politician 1.

When $\sigma_{-i} = P$

$$\begin{aligned}
EU_1(P,P) &= (1 - 0.5c)T \\
EU_1(L,P) &= 0.5T - 0.5c(1 - r)T \\
EU_1(R,P) &= (0.5 - 0.5cr)T \\
EU_1(G,P) &= 0.5T \\
EU_1(D,P) &= (0.5 - 0.5c)T
\end{aligned}$$

Finding the conditions for $EU_1(P,P) \geq EU_1(\sigma_i, P)$, where $\sigma_i \neq P$,

$$\begin{aligned}
EU_1(P,P) &\geq EU_1(L,P) \\
(1 - 0.5c)T &\geq 0.5T - 0.5c(1 - r)T \\
T &\geq crT \\
T &\geq 0
\end{aligned}$$

$$\begin{aligned}
EU_1(P,P) &\geq EU_1(R,P) \\
(1 - 0.5c)T &\geq (0.5 - 0.5cr)T \\
T &\geq 0
\end{aligned}$$

$$\begin{aligned}
EU_1(P,P) &\geq EU_1(G,P) \\
(1 - 0.5c)T &\geq 0.5T \\
T &\geq 0
\end{aligned}$$

$$
\begin{aligned}
EU_1(P,P) &\geq EU_1(D,P) \\
(1-0.5c)T &\geq (0.5-0.5c)T \\
T &\geq 0
\end{aligned}
$$

From the above, for all possible combinations of T, r, and c , P provides the highest expected utility when $\sigma_{-i} = P$.

$$
BR_i(P) = P
$$

When $\sigma_{-i} = L$

$$
\begin{aligned}
EU_1(P,L) &= 0.5 - 0.5cr + 0.5T - 0.5c(1-r)T \\
EU_1(L,L) &= (1 - 0.5c(1-r))T \\
EU_1(R,L) &= 0.5 - 0.5cr \\
EU_1(G,L) &= 0.5 - r(0.5 - T) \\
EU_1(D,L) &= r(0.5 - 0.5c(1-T) - T) + (1-0.5c)T
\end{aligned}
$$

Finding the conditions for $EU_1(L,L) \geq EU_1(\sigma_i, L)$, where $\sigma_i \neq L$,

$$
\begin{aligned}
EU_1(L,L) &\geq EU_1(P,L) \\
(1-0.5c(1-r))T &\geq 0.5 - 0.5cr + 0.5T - 0.5c(1-r)T \\
T &\geq 1 - cr
\end{aligned}
$$

$$
\begin{aligned}
EU_1(L,L) &\geq EU_1(R,L) \\
(1-0.5c(1-r))T &\geq 0.5 - 0.5cr \\
T &\geq \frac{1-cr}{2-c+cr}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(L,L) &\geq EU_1(G,L) \\
(1-0.5c(1-r))T &\geq 0.5 - r(0.5-T) \\
(2-c)(1-r)T &\geq 1-r \\
T &\geq \frac{1}{2-c}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(L,L) &\geq EU_1(D,L) \\
(1-0.5c(1-r))T &\geq r(0.5-0.5c(1-T)-T) + (1-0.5c)T \\
(2-c)(1-r)T &\geq 1-r \\
T &\geq \frac{1}{2-c}
\end{aligned}
$$

As the condition for $EU_1(L,L) \geq EU_1(P,L)$, $T \geq 1-cr$, is more stringent than that of $EU_1(L,L) \geq EU_1(R,L)$, wefind that for $T \geq 1-cr$ and $T \geq \frac{1}{2-c}$, L is the best response for $\sigma_{-i} = L$.

We compare the remaining expected utilities to find the best responses for $T < 1-cr$ and $T < \frac{1}{2-c}$,

$$
\begin{aligned}
EU_1(P,L) &\geq EU_1(R,L) \\
0.5 - 0.5cr + 0.5T - 0.5c(1-r)T &\geq 0.5 - 0.5cr \\
(1-c+cr)T &\geq 0 \\
T &\geq 0
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,L) &\geq EU_1(G,L) \\
0.5 - 0.5cr + 0.5T - 0.5c(1-r)T &\geq 0.5 - r(0.5-T) \\
T(1-c+cr-2r) &\geq cr-r \\
T &\leq \frac{cr-r}{1-c+cr-2r}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,L) &\geq EU_1(D,L)\\
0.5-0.5cr+0.5T-0.5c(1-r)T &\geq r(0.5-0.5c(1-T)-T)+(1-0.5c)T\\
T &\geq \frac{1-r}{1-2r}
\end{aligned}
$$

Note that as $\frac{1-r}{1-2r} < 0$, $EU_1(P,L) \geq EU_1(D,L)$ for all T. From the results above, the best response function for $\sigma_{-i} = L$ is give below:

$$
BR_i(L) = \begin{cases} L & if\, T \geq 1-cr\, and\, T \geq \frac{1}{2-c},\\ G & if\, \frac{cr-r}{1-c+cr-2r} \geq T < \frac{1}{2-c},\\ P & if\, T < 1-cr\, and\, T \leq \frac{cr-r}{1-c+cr-2r} \end{cases}
$$

When $\sigma_{-i} = R$

$$
\begin{aligned}
EU_1(P,R) &= 0.5+c(-0.5+0.5r(1-T))+0.5T\\
EU_1(L,R) &= 0.5+c(-0.5+0.5r)\\
EU_1(R,R) &= (1-0.5cr)T\\
EU_1(G,R) &= r(0.5-T)+T\\
EU_1(D,R) &= 0.5+c(-0.5+r(0.5-0.5T))-r(0.5-T)
\end{aligned}
$$

Finding the conditions for $EU_1(R,R) \geq EU_1(\sigma_i,R)$, where $\sigma_i \neq R$,

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(P,R)\\
(1-0.5cr)T &\geq 0.5+c(-0.5+0.5r(1-T))+0.5T\\
T &\geq 1-c+cr
\end{aligned}
$$

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(G,R)\\
(1-0.5cr)T &\geq 0.5-0.5cr+0.5T-0.5c(1-r)T
\end{aligned}
$$

$$
\begin{aligned}
(-0.5cr + r)T &\geq r(0.5) \\
T &\geq \frac{1}{2-c}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(L,R) \\
(1-0.5cr)T &\geq 0.5 + c(-0.5+0.5r) \\
T &\geq \frac{1-c+cr}{2-cr}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(R,R) &\geq EU_1(D,R) \\
(1-0.5cr)T &\geq 0.5 + c(-0.5+r(0.5-0.5T)) - r(0.5-T) \\
T &\geq \frac{1-c}{2}
\end{aligned}
$$

When $T \geq 1-c+cr$ and $T \geq \frac{1}{2-c}$, strategy *Right* provides politicians with largest expected utility.

Comparing expected utilities for $\sigma_{-i} = R$, we find the best responses for the remaining values of T:

$$
\begin{aligned}
EU_1(P,R) &\geq EU_1(L,R) \\
0.5 + c(-0.5+0.5r(1-T)) + 0.5T &\geq 0.5 + c(-0.5+0.5r) \\
T &\geq 0
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,R) &\geq EU_1(G,R) \\
0.5 + c(-0.5+0.5r(1-T)) + 0.5T &\geq r(0.5-T) + T \\
T &\leq \frac{(r-1)(1-c)}{2r-1-cr}
\end{aligned}
$$

$$
\begin{aligned}
EU_1(P,R) &\geq EU_1(D,R) \\
0.5 + c(-0.5+0.5r(1-T)) + 0.5T &\geq 0.5 + c(-0.5+r(0.5-0.5T)) - r(0.5-T) \\
T &\leq \frac{r}{2r-1}
\end{aligned}
$$

Note that as $\frac{r}{2r-1} > 1$, $EU_1(P,R) \geq EU_1(D,R)$ for all T. From the results above, the best response function for $\sigma_{-i} = R$ is give below:

$$BR_i(R) = \begin{cases} R & if\, T \geq 1 - c + cr\, and\, T \geq \frac{1}{2-c}, \\ G & if\, \frac{(r-1)(1-c)}{2r-1-cr} \geq T < \frac{1}{2-c} and, \\ P & if\, T < 1 - c + cr\, and\, T \leq \frac{(r-1)(1-c)}{2r-1-cr} \end{cases}$$

When $\sigma_{-i} = G$

$$\begin{aligned} EU_1(P, G) &= 0.5 - 0.5c + 0.5T \\ EU_1(L, G) &= 0.5 + c(-0.5 + 0.5r) + r(-0.5 + T) \\ EU_1(R, G) &= r(0.5 - 0.5c - T) + T \\ EU_1(G, G) &= T \\ EU_1(D, G) &= 0.5 - 0.5c \end{aligned}$$

Finding the conditions for $EU_1(G, G) \geq EU_1(\sigma_i, G)$, where $\sigma_i \neq G$,

$$\begin{aligned} EU_1(G, G) &\geq EU_1(P, G) \\ T &\geq 0.5 - 0.5c + 0.5T \\ T &\geq 1 - c \end{aligned}$$

$$\begin{aligned} EU_1(G, G) &\geq EU_1(L, G) \\ T &\geq 0.5 + c(-0.5 + 0.5r) + r(-0.5 + T) \\ T(1 - r) &\geq 0.5(1 - c)(1 - r) \\ T &\geq \frac{1 - c}{2} \end{aligned}$$

$$\begin{aligned} EU_1(G, G) &\geq EU_1(R, G) \\ rT &\geq r(0.5 - 0.5c) \\ T &\geq \frac{1 - c}{2} \end{aligned}$$

$$EU_1(G, G) \geq EU_1(D, G)$$

$$T \geq \frac{1-c}{2}$$

When $T \geq 1-c$, G is the best response to $\sigma_{-i} = G$.

Comparing the utilities for the remaining strategies,

$$\begin{aligned}
EU_1(P,G) &\geq EU_1(L,G) \\
0.5 - 0.5c + 0.5T &\geq 0.5 + c(-0.5 + 0.5r) + r(-0.5 + T) \\
T(r - 0.5) &\geq 0.5cr - 0.5r \\
T &\geq \frac{cr - r}{2r - 1}
\end{aligned}$$

$$\begin{aligned}
EU_1(P,G) &\geq EU_1(R,G) \\
0.5 - 0.5c + 0.5T &\geq r(0.5 - 0.5c) \\
T &\geq (r-1)(0.5 - 0.5c) \\
T &\geq (1-c)(r-1)
\end{aligned}$$

$$\begin{aligned}
EU_1(P,G) &\geq EU_1(D,G) \\
0.5 - 0.5c + 0.5T &\geq \frac{1-c}{2} \\
T &\geq 0
\end{aligned}$$

The constraints above are either zero or negative. For the remaining T values, $T < 1-c$, P is the best response.

$$BR_i(G) = \begin{cases} G & if\, T \geq 1-c, \\ P & otherwise \end{cases}$$

When $\sigma_{-i} = D$

$$\begin{aligned}
EU_1(P,D) &= 0.5 + (0.5 - 0.5c)T \\
EU_1(L,D) &= (1-r)(1 - 0.5c)T + 0.5r \\
EU_1(R,D) &= 0.5 + r(-0.5 + (1 - 0.5c)T)
\end{aligned}$$

$$EU_1(G, D) = 0.5$$
$$EU_1(D, D) = (1 - 0.5c)T$$

Finding the conditions for $EU_1(D, D) \geq EU_1(\sigma_i, D)$, where $\sigma_i \neq D$,

$$\begin{aligned} EU_1(D, D) &\geq EU_1(P, D) \\ (1 - 0.5c)T &\geq 0.5 + (0.5 - 0.5c)T \\ (0.5)T &\geq 0.5 \\ T &\geq 1 \end{aligned}$$

$$\begin{aligned} EU_1(D, D) &\geq EU_1(L, D) \\ (1 - 0.5c)T &\geq (1 - r)(1 - 0.5c)T + 0.5r \\ rT &\geq 0.5r \\ T &\geq 0.5 \end{aligned}$$

$$\begin{aligned} EU_1(D, D) &\geq EU_1(R, D) \\ (1 - 0.5c)T &\geq 0.5 + r(-0.5 + (1 - 0.5c)T) \\ (1 - r)(1 - 0.5c)T &\geq 0.5(1 - r) \\ T &\geq \frac{1}{2 - c} \end{aligned}$$

$$\begin{aligned} EU_1(D, D) &\geq EU_1(G, D) \\ (1 - 0.5c)T &\geq 0.5 \\ T &\geq 0 \end{aligned}$$

From the above, we find that *Pander* dominates *Destructive* and *Destructive* dominates *Good* for $\sigma_{-i} = D$. Comparing the expected utility of strategy Pander to those of the remaining strategies,

$$\begin{aligned} EU_1(P, D) &\geq EU_1(L, D) \\ 0.5 + (0.5 - 0.5c)T &\geq (1 - r)(1 - 0.5c)T + 0.5r - 0.5 \\ (-0.5 + r - 0.5cr)T &\geq 0.5r - 1 \end{aligned}$$

$$T \leq \frac{2-r}{1-2r+cr}$$

$$\begin{aligned} EU_1(P,D) &\geq EU_1(R,D) \\ 0.5+(0.5-0.5c)T &\geq 0.5+r(-0.5+(1-0.5c)T) \\ (0.5-0.5c)T &\geq r(-0.5+(1-0.5c)T) \\ T &\geq 0 \end{aligned}$$

$$\begin{aligned} EU_1(P,D) &\geq EU_1(G,D) \\ 0.5+(0.5-0.5c)T &\geq 0.5 \\ T &\geq 0 \end{aligned}$$

For $T \geq 0.5$, $EU_1(P,D) \geq EU_1(D,D) \geq EU_1(L,D)$. Checking if $EU_1(P,D) \geq EU_1(L,D)$ for $T < 0.5$,

$$\begin{aligned} 0.5 &\leq \frac{2-r}{1-2r+cr} \\ 0.5cr &\leq 1.5 \\ cr &\leq 3 \end{aligned}$$

As cr is always less than 3, and $T \geq 0$, then for $T < 0.5$, P is the best response.

$$BR_i(D) = P$$

D.1 Equilibria

The pure-strategy Bayesian Nash Equilibria for the game is computed from the best responses above.

$s^* = (\sigma_1^*, \sigma_2^*) \in S$ is a Bayesian Nash Equilibrium if $\sigma_i^* \in B_i(\sigma_{-i}^*)$ for every $i \in I$.

When the issue is non-salient and the popular choice is clear, *Pander* is always an equilibrium action, and the popular policy is implemented. At sufficiently high policy payoffs, other policies may also be implemented The equilibria is summarized in *Proposition 3* below.

Proposition 3

When the popular choice is clear ($q_i = q_{-i} = 1$) and the issue is non-salient ($\gamma = 1$),

1. (P,P) is always an equilibrium
2. If $T \geq 1 - c$, there exists an equilibrium (G,G) ,
3. If $T \geq 1 - cr$ and $T \geq \frac{1}{2-c}$, there exists an equilibrium (L,L) , and
4. If $T \geq 1 - c(1-r)$ and $T \geq \frac{1}{2-c}$, there exists an equilibrium (R,R).

E Best Responses and Equilibria: $q_i = q_{-i} = 1$, $\gamma = 0$

The computation of the best responses of politicians when the popular opinion is clear on a salient issue are shown in full below.

Substituting $q_i = q_{-i} = 1$, $\gamma = 0$ to the expected utilities above, the best responses for all possible opponent strategies: $\Sigma_i = \{P, L, R, G, D\}$ are shown in full for politician 1.

When $\sigma_{-i} = P$

$$EU_1(P,P) = (1 - 0.5c)T$$
$$EU_1(L,P) = 0.5T - 0.5c(1-r)T$$
$$EU_1(R,P) = (0.5 - 0.5cr)T$$
$$EU_1(G,P) = 0.5T$$
$$EU_1(D,P) = (0.5 - 0.5c)T$$

The expected utilities for each σ_i, given $\sigma_{-i} = P$ and $q = 1$, are the same for both $\gamma = 0$ and $\gamma = 1$. Based on the results of the previous section, the best response function for $\sigma_{-i} = P$ is as follows.

$$BR_i(P) = P$$

When $\sigma_{-i} = L$

$$EU_1(P,L) = 0.5 - 0.5cr + 0.5T - 0.5c(1-r)T$$
$$EU_1(L,L) = 0.5T - 0.5c(1-r)T$$
$$EU_1(R,L) = 0.5 - 0.5cr$$
$$EU_1(G,L) = 0.5 + r(-0.5 + 0.5T)$$
$$EU_1(D,L) = 0.5(1-c)(T(1-r) + r)$$

Finding the conditions for $EU_1(L, L) \geq EU_1(\sigma_i, L)$, where $\sigma_i \neq L$,

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(P, L) \\
0.5T - 0.5c(1-r)T &\geq 0.5 - 0.5cr + 0.5T - 0.5c(1-r)T \\
0 &\geq 1 - cr \\
cr &\geq 1
\end{aligned}$$

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(R, L) \\
0.5T - 0.5c(1-r)T &\geq 0.5 - 0.5cr \\
T &\geq \frac{1 - cr}{1 - c + cr}
\end{aligned}$$

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(G, L) \\
0.5T - 0.5c(1-r)T &\geq 0.5 + r(-0.5 + 0.5T) \\
T(1-r)(1-c) &\geq 1 - r \\
T &\geq \frac{1}{1-c}
\end{aligned}$$

$$\begin{aligned}
EU_1(L, L) &\geq EU_1(D, L) \\
0.5T - 0.5c(1-r)T &\geq 0.5(1-c)(T(1-r) + r) \\
(1 - c + cr)T &\geq (1-c)(1-r)T + (1-c)r \\
T &\geq 1 - c
\end{aligned}$$

From the above, we find that the strategies *Pander* and *Good* always provides politicians with a higher expected utility than *Left*. When $T \geq 1 - c$, L provides a higher expected utility than strategies R and D.

Comparing $EU_1(P, L)$ and $EU_1(G, L)$,

$$\begin{aligned}
EU_1(P, L) &\geq EU_1(G, L) \\
0.5 - 0.5cr + 0.5T - 0.5c(1-r)T &\geq 0.5 + r(-0.5 + 0.5T) \\
(1-c)(1-r)T &\geq r(c-1) \\
T &\geq \frac{-r}{1-r}
\end{aligned}$$

As $T \in [0, 1]$, $EU_1(P, L) \geq EU_1(G, L)$ for all T. Comparing the expected utilities of the remaining strategies R and D to P,

$$\begin{aligned}
EU_1(P, L) &\geq EU_1(R, L) \\
0.5 - 0.5cr + 0.5T - 0.5c(1-r)T &\geq 0.5 - 0.5cr \\
(1 - c + cr)T &\geq 0 \\
T &\geq 0
\end{aligned}$$

$$\begin{aligned}
EU_1(P, L) &\geq EU_1(D, L) \\
0.5 - 0.5cr + 0.5T - 0.5c(1-r)T &\geq 0.5(1-c)(T(1-r)+r) \\
T &\geq \frac{r-1}{r}
\end{aligned}$$

P dominates both strategies for all possible values of T.

$$BR_i(L) = P$$

When $\sigma_{-i} = R$

$$\begin{aligned}
EU_1(P, R) &= 0.5 + c(-0.5 + 0.5r(1-T)) + 0.5T \\
EU_1(L, R) &= 0.5 + c(-0.5 + 0.5r) \\
EU_1(R, R) &= (0.5 - 0.5cr)T \\
EU_1(G, R) &= r(0.5 - 0.5T) + 0.5T \\
EU_1(D, R) &= 0.5(1-c)(1 + r(T-1))
\end{aligned}$$

Finding the conditions for $EU_1(P, R) \geq EU_1(\sigma_i, R)$, where $\sigma_i \neq P$,

$$\begin{aligned}
EU_1(P, R) &\geq EU_1(L, R) \\
0.5 + c(-0.5 + 0.5r(1-T)) + 0.5T &\geq 0.5 + c(-0.5 + 0.5r) \\
-rT + T &\geq 0 \\
T &\geq 0
\end{aligned}$$

$$\begin{aligned}
EU_1(P,R) &\geq EU_1(R,R) \\
0.5 + c(-0.5 + 0.5r(1-T)) + 0.5T &\geq (0.5 - 0.5cr)T \\
1 - c + cr &\geq 0 \\
c &\leq \frac{1}{1-r}
\end{aligned}$$

$$\begin{aligned}
EU_1(P,R) &\geq EU_1(G,R) \\
0.5 + c(-0.5 + 0.5r(1-T)) + 0.5T &\geq r(0.5 - 0.5T) + 0.5T \\
(r - cr)T &\geq -(1-c)(1-r) \\
T &\geq \frac{r-1}{r}
\end{aligned}$$

$$\begin{aligned}
EU_1(P,R) &\geq EU_1(D,R) \\
0.5 + c(-0.5 + 0.5r(1-T)) + 0.5T &\geq 0.5(1-c)(1 + r(T-1)) \\
(1-r)T &\geq -r \\
T &\geq \frac{-r}{1-r}
\end{aligned}$$

As $c \in [0,1]$, and T is non-negative, P is the best response for $\sigma_{-i} = R$.

$$BR_i(R) = P$$

When $\sigma_{-i} = G$

$$\begin{aligned}
EU_1(P,G) &= 0.5 - 0.5c + 0.5T \\
EU_1(L,G) &= 0.5 + c(-0.5 + 0.5r) + r(-0.5 + 0.5T) \\
EU_1(R,G) &= -0.5cr + 0.5(r + T - rT) \\
EU_1(G,G) &= 0.5T \\
EU_1(D,G) &= 0.5 - 0.5c
\end{aligned}$$

Finding the conditions for $EU_1(P,G) \geq EU_1(\sigma_i, G)$, where $\sigma_i \neq P$,

$$\begin{aligned}
EU_1(P,G) &\geq EU_1(L,G) \\
0.5 - 0.5c + 0.5T &\geq 0.5 + c(-0.5 + 0.5r) + r(-0.5 + 0.5T) \\
(1-r)T &\geq cr - r \\
T &\geq \frac{r(c-1)}{1-r}
\end{aligned}$$

$$\begin{aligned}
EU_1(P,G) &\geq EU_1(R,G) \\
0.5 - 0.5c + 0.5T &\geq -0.5cr + 0.5(r + T - rT) \\
1 - c - r + cr &\geq -rT \\
T &\geq \frac{-(1-c)(1-r)}{r}
\end{aligned}$$

$$\begin{aligned}
EU_1(P,G) &\geq EU_1(G,G) \\
0.5 - 0.5c + 0.5T &\geq 0.5T \\
c &\leq 1
\end{aligned}$$

$$\begin{aligned}
EU_1(P,G) &\geq EU_1(D,G) \\
0.5 - 0.5c + 0.5T &\geq 0.5 - 0.5c \\
T &\geq 0
\end{aligned}$$

As the conditions are above are either zero on negative for T, and $c \in [0,1]$, P provides the highest expected utility value for $\sigma_{-i} = G$.

$$BR_i(G) = P$$

When $\sigma_{-i} = D$

$$\begin{aligned}
EU_1(P,D) &= 0.5 + (0.5 - 0.5c)T \\
EU_1(L,D) &= 0.5c(-1 + r)T + 0.5(r + T - rT) \\
EU_1(R,D) &= 0.5 + r(-0.5 + (0.5 - 0.5c)T)
\end{aligned}$$

$$EU_1(G, D) = 0.5$$
$$EU_1(D, D) = (0.5 - 0.5c)T$$

Finding the conditions for $EU_1(P, D) \geq EU_1(\sigma_i, D)$, where $\sigma_i \neq P$,

$$\begin{aligned} EU_1(P, D) &\geq EU_1(L, D) \\ 0.5 + (0.5 - 0.5c)T &\geq 0.5c(-1 + r)T + 0.5(r + T - rT) \\ (r - cr)T &\geq +r - 1 \\ T &\geq \frac{r - 1}{r - cr} \end{aligned}$$

$$\begin{aligned} EU_1(P, D) &\geq EU_1(R, D) \\ 0.5 + (0.5 - 0.5c)T &\geq 0.5 + r(-0.5 + (0.5 - 0.5c)T) \\ (1 - r)(1 - c)T &\geq -r \\ T &\geq \frac{-r}{(1 - r)(1 - c)} \end{aligned}$$

$$\begin{aligned} EU_1(P, D) &\geq EU_1(G, D) \\ 0.5 + (0.5 - 0.5c)T &\geq 0.5 \\ T &\geq 0 \end{aligned}$$

$$\begin{aligned} EU_1(P, D) &\geq EU_1(D, D) \\ 0.5 + (0.5 - 0.5c)T &\geq (0.5 - 0.5c)T \\ 0.5 &\geq 0 \end{aligned}$$

As the conditions above are always satisfied, P is the best response for $\sigma_{-i} = D$.

$$BR_i(D) = P$$

E.1 Equilibria

The pure-strategy Bayesian Nash Equilibria for the game is computed from the best responses above.

$s^* = (\sigma_1^*, \sigma_2^*) \in S$ is a Bayesian Nash Equilibrium if $\sigma_i^* \in B_i(\sigma_{-i}^*)$ for every $i \in I$.

The best response for all possible strategies in Σ_{-i} is P, given $\gamma = 0$ and $q = 1$. We summarize the findings in Proposition 4 below.

Proposition 4

When the popular choice is clear and the issue is salient ($\gamma = 0$), both politicians will pander in equilibrium (P,P).

F Comparative Statics

The expected utilities are expected to change as the accuracy of the information on the socially optimal state, r, increases. The variation of payoffs for both $q = 0.5$ and $q = 1$ are examined first through obtaining the first derivatives of expected utilities given r.

When $q = 0.5$

$$\frac{\partial EU_1(P,P)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,P)}{\partial r} = c(0.25 + 0.25T)$$
$$\frac{\partial EU_1(R,P)}{\partial r} = c(-0.25 - 0.25T)$$
$$\frac{\partial EU_1(G,P)}{\partial r} = 0$$
$$\frac{\partial EU_1(D,P)}{\partial r} = 0$$

$$\frac{\partial EU_1(P,L)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,L)}{\partial r} = 0.5cT$$
$$\frac{\partial EU_1(R,L)}{\partial r} = -0.5c$$
$$\frac{\partial EU_1(G,L)}{\partial r} = -0.5 + 0.5T(1+\gamma)$$
$$\frac{\partial EU_1(D,L)}{\partial r} = 0.5(c-1-\gamma)T + 0.5(1-c)$$

$$\frac{\partial EU_1(P,R)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,R)}{\partial r} = 0.5c$$
$$\frac{\partial EU_1(R,R)}{\partial r} = -0.5cT$$
$$\frac{\partial EU_1(G,R)}{\partial r} = 0.5 - 0.5T(1+\gamma)$$

$$\frac{\partial EU_1(D,R)}{\partial r} = 0.5(1-c+\gamma)T - 0.5(1-c)$$

$$\frac{\partial EU_1(P,G)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,G)}{\partial r} = -0.5(1-c) + 0.5T(1+\gamma)$$
$$\frac{\partial EU_1(R,G)}{\partial r} = 0.5(1-c) - 0.5T(1+\gamma)$$
$$\frac{\partial EU_1(G,G)}{\partial r} = 0$$
$$\frac{\partial EU_1(D,G)}{\partial r} = 0$$

$$\frac{\partial EU_1(P,D)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,D)}{\partial r} = 0.5 - 0.5T(1-c+\gamma)$$
$$\frac{\partial EU_1(R,D)}{\partial r} = -0.5 + 0.5T(1-c+\gamma)$$
$$\frac{\partial EU_1(G,D)}{\partial r} = 0$$
$$\frac{\partial EU_1(D,D)}{\partial r} = 0$$

When $q = 1$

$$\frac{\partial EU_1(P,P)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,P)}{\partial r} = 0.5cT$$
$$\frac{\partial EU_1(R,P)}{\partial r} = -0.5cT$$
$$\frac{\partial EU_1(G,P)}{\partial r} = 0$$
$$\frac{\partial EU_1(D,P)}{\partial r} = 0$$

$$\frac{\partial EU_1(P,L)}{\partial r} = -0.5c(1-T)$$

$$\frac{\partial EU_1(L,L)}{\partial r} = 0.5cT$$
$$\frac{\partial EU_1(R,L)}{\partial r} = -0.5c$$
$$\frac{\partial EU_1(G,L)}{\partial r} = -0.5 + 0.5T(1+\gamma)$$
$$\frac{\partial EU_1(D,L)}{\partial r} = 0.5(c-1-\gamma)T + 0.5(1-c)$$

$$\frac{\partial EU_1(P,R)}{\partial r} = 0.5 - 0.5cT$$
$$\frac{\partial EU_1(L,R)}{\partial r} = 0.5c$$
$$\frac{\partial EU_1(R,R)}{\partial r} = -0.5cT$$
$$\frac{\partial EU_1(G,R)}{\partial r} = 0.5 - 0.5T(1+\gamma)$$
$$\frac{\partial EU_1(D,R)}{\partial r} = 0.5(1-c+\gamma)T - 0.5(1-c)$$

$$\frac{\partial EU_1(P,G)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,G)}{\partial r} = -0.5(1-c) + 0.5T(1+\gamma)$$
$$\frac{\partial EU_1(R,G)}{\partial r} = 0.5(1-c) - 0.5T(1+\gamma)$$
$$\frac{\partial EU_1(G,G)}{\partial r} = 0$$
$$\frac{\partial EU_1(D,G)}{\partial r} = 0$$

$$\frac{\partial EU_1(P,D)}{\partial r} = 0$$
$$\frac{\partial EU_1(L,D)}{\partial r} = 0.5 - 0.5T(1-c+\gamma)$$
$$\frac{\partial EU_1(R,D)}{\partial r} = -0.5 + 0.5T(1-c+\gamma)$$
$$\frac{\partial EU_1(G,D)}{\partial r} = 0$$
$$\frac{\partial EU_1(D,D)}{\partial r} = 0$$

Comparing the first derivatives above, I find that the first derivative values are the same for $q = 0.5$ and $q = 1$ with the exception of $\sigma_i = P$ for opponent strategies L and R. When $q = 1$, pandering is more likely to occur as politicians know for certain what the popular choice is. For strategy profiles in S_i that is a combination of strategies P, G, and D, there are no effects in the change of r.

We summarize the effect of variations in r on expected utilities in the table below:

Changes in Expected Utility given $\uparrow r$		
$EU_1(\sigma_i, \sigma_{-i})$	$q = 0.5$	$q = 1$
$EU_1(P, P)$	no effect	no effect
$EU_1(L, P)$	$\uparrow$	$\uparrow$
$EU_1(R, P)$	$\downarrow$	$\downarrow$
$EU_1(G, P)$	no effect	no effect
$EU_1(D, P)$	no effect	no effect
$EU_1(P, L)$	no effect	$\downarrow$
$EU_1(L, L)$	$\uparrow$	$\uparrow$
$EU_1(R, L)$	$\downarrow$	$\downarrow$
$EU_1(G, L)$	$\uparrow$, $if\, T > \frac{1}{1+\gamma}$	$\uparrow$, $if\, T > \frac{1}{1+\gamma}$
$EU_1(D, L)$	$\uparrow$, $if\, T < \frac{1-c}{1-c+\gamma}$	$\uparrow$, $T < \frac{1-c}{1-c+\gamma}$
$EU_1(P, R)$	no effect	$\uparrow$
$EU_1(L, R)$	$\uparrow$	$\uparrow$
$EU_1(R, R)$	$\downarrow$	$\downarrow$
$EU_1(G, R)$	$\uparrow$, $if\, T < \frac{1}{1+\gamma}$	$\uparrow$, $if\, T < \frac{1}{1+\gamma}$
$EU_1(D, R)$	$\uparrow$, $if\, T > \frac{1-c}{1-c+\gamma}$	$\uparrow$, $T > \frac{1-c}{1-c+\gamma}$
$EU_1(P, R)$	no effect	$\uparrow$
$EU_1(L, R)$	$\uparrow$	$\uparrow$
$EU_1(R, R)$	$\downarrow$	$\downarrow$
$EU_1(G, R)$	$\uparrow$, $if\, T < \frac{1}{1+\gamma}$	$\uparrow$, $if\, T < \frac{1}{1+\gamma}$
$EU_1(D, R)$	$\uparrow$, $if\, T > \frac{1-c}{1-c+\gamma}$	$\uparrow$, $T > \frac{1-c}{1-c+\gamma}$
$EU_1(P, G)$	no effect	no effect
$EU_1(L, G)$	$\uparrow$, $if\, T > \frac{1-c}{1+\gamma}$	$\uparrow$, $if\, T > \frac{1-c}{1+\gamma}$
$EU_1(R, G)$	$\uparrow$, $if\, T < \frac{1-c}{1+\gamma}$	$\uparrow$, $if\, T < \frac{1-c}{1+\gamma}$
$EU_1(G, G)$	no effect	no effect
$EU_1(D, G)$	no effect	no effect
$EU_1(P, D)$	no effect	no effect
$EU_1(L, D)$	$\uparrow$, $if\, T < \frac{1}{1-c+\gamma}$	$\uparrow$, $if\, T < \frac{1}{1-c+\gamma}$
$EU_1(R, D)$	$\uparrow$, $if\, T > \frac{1}{1-c+\gamma}$	$\uparrow$, $if\, T > \frac{1}{1-c+\gamma}$
$EU_1(G, D)$	no effect	no effect
$EU_1(D, D)$	no effect	no effect

VI

Paper 3:
Vying for Support: Lobbying a Legislator with Uncertain Preferences

Statement of Authorship

<table>
<tr><td colspan="10">This declaration concerns the article entitled:</td></tr>
<tr><td colspan="10">Vying for Support: Lobbying a Legislator with Uncertain Preferences</td></tr>
<tr><td colspan="10">Publication status (tick one)</td></tr>
<tr><td>draft manuscript</td><td>x</td><td>Submitted</td><td></td><td>In review</td><td></td><td>Accepted</td><td></td><td>Published</td><td></td></tr>
<tr><td>Publication details (reference)</td><td colspan="9"></td></tr>
<tr><td>Candidate’s contribution to the paper (detailed, and also given as a percentage).</td><td colspan="9">The candidate contributed to/ considerably contributed to/predominantly executed the…

Formulation of ideas:

- Predominantly contributed to the formulation of ideas (70%)

Design of methodology:

- Predominantly contributed to the formulation of ideas (70%)

<s>Experimental work:</s>

Presentation of data in journal format:

- Predominantly contributed to the formulation of ideas (90%)</td></tr>
<tr><td>Statement from Candidate</td><td colspan="9">This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.</td></tr>
<tr><td>Signed</td><td colspan="5">Anne Marie Go</td><td colspan="2">Date</td><td colspan="2">07/05/2019</td></tr>
</table>

Vying for Support: Lobbying a Legislator with Uncertain Preferences

Anne Marie Go *   Nikolaos Kokonas †   Javier Rivas ‡

Abstract

We consider a model of lobbying where two opposing lobbyists vye for the support of a legislator with uncertain preferences. Lobbyist bids are only considered when the integrity threshold of the legislator is met. When the degree of uncertainty about the legislator is low, lobbyists bid aggressively. Conversely, if the degree of uncertainty is high, the possibility of overbidding is high enough to have the lobbyists bid conservatively. When the degree of uncertainty is moderate, we find asymmetric equilibria where one lobbyist chooses to either bid conservatively or aggressively, and the other just enough to ensure that the average bid is equal to the legislator's integrity threshold.

JEL Classication: D72, D80

*Department of Economics, University of Bath; Email: a.go@bath.ac.uk
†Department of Economics, University of Bath; Email: n.kokonas@bath.ac.uk
‡Department of Economics, University of Bath; Email: j.rivas@bath.ac.uk

1 Introduction

Lobbying is ubiquitous in most legislative systems. Other forms of lobbying, such as shadow lobbying, also exist outside legal bounds - influencing policy outcomes without oversight. Lobbying effects in legislation are often studied through majoritarian systems and overall policy outcomes. The process in which lobbying influences legislation, however, is not yet fully understood. Since the Abramoff lobbying scandal in 2006, there has been a significant effort to regulate lobbying in the United States. The number of registered lobbyists have consistently decreased from 2007, however, spending on lobbying has continued to increase and has remained above the $3 billion mark since 2008 (Center for Responsive Politics, 2018).

This paper aims to study the effects of uncertainty in lobbyist behaviour. We approach the lobbying process as one where cash-for-favour exchanges occur as a means to obtain access to legislators. The model takes into account the degree of uncertainty on a non-strategic legislator's preference, the legislator's level of integrity, and the perceived advantages each lobbyist may have on their respective policies. Instead, we adopt a simultaneous lobbying structure to capture how lobbying proceeds behind closed doors. Under shadow lobbying, where lobbyist- legislator interactions are kept private, the opportunity for lobbyists to counteroffer may not exist. The simultaneous lobbying approach takes this into account and retains focus on how interactions center on the uncertainty of legislator preferences.

In this paper, we find that the degree of uncertainty of legislator preferences, given by the length of the bias intervals, directly affects the bidding strategy of lobbyists. At low levels of uncertainty, lobbyists bid aggressively. The bias of the legislator is not high enough to risk losing the legislator's support. Each lobbyist ensures that they bid high enough to stay competitive. Conversely, we find that if the uncertainty sufficiently high, the lobbyists take a chance and bid more conservatively. Under moderate levels of uncertainty, the lobbyists bid just enough to ensure that the legislator chooses a policy to support. We also observe asymmetric equilibria under moderate level of uncertainty.

The paper moves away from the sequential lobbying structure introduced by Groseclose and Snyder (1996). Opposing lobbyists may not be able to provide a counteroffer when lobbying proceeds behind closed doors. By using a simultaneous lobbying structure, we take into account for the possibility counteroffers may not be feasible. We explore uncertainty by focusing on lobbyist behaviour when faced with uncertain legislator preferences similar to Buzard and Saiegh (2016) and Dekel et al. (2006). However, uncertainty is rarely explored on its own. We redirect the focus of the paper to lobbyist interactions over one non-strategic legislator. We remove the dimension of budget allocation and instead assume that the lobbyists are willing to pay at most the value of the legislator support. The results show that uncertainty on its own can provide some good insights on how lobbying unfolds.

Understanding the lobbying process may help provide additional insight on the lobbying's revolving-door phenomenon explored where former staffers turned lobbyists use their connections to incumbents to push for legislation (Blanes i Vidal et al., 2012; LaPira and Thomas, 2014; Lazarus et al., 2016) . A large body of literature exists on the effects of lobbying on policy outcomes, either through information or transactional exchanges (Austen-Smith, 1993; Groseclose and Snyder, 1996; de Figueiredo, 2002; Hall and Deardorff, 2006). Both perspectives have been widely discussed, with empirical evidence suggesting that the effects of cash-for-favour lobbying activities are marginal (Grossman and Helpman, 1994; Ansolabehere et al., 2003; de Figueiredo and Richter, 2013). Despite this and increased regulation in the lobbying industry, lobbying expenditure is still substantially higher than Political Action Campaign (PAC) contributions in the United States (Milyo et al., 2000; de Figueiredo and Richter, 2013). Furthermore, although uncertainty is one of the key features of the lobbying process, it has yet to be fully explored.

The preferences of legislators are often private and unknown to the lobbyists (Heberlig, 2005). Austen-Smith and Wright (1992) looked at lobbying as an information transmission at the agenda-setting and voting stages and found that when there is occassional uncertainty on how informed the lobbyist is, more information transmission can occur. Buzard and Saiegh (2016) however on sequential vote buying models, specifically the allocation of bribes amongst three legislators. Dekel et al. (2006) looked at vote buying and explored as an extension the presence of uncertainty in legislatures. They found that with a large enough body of legislators, one can predict who the winning lobbyist is. Tyutin and Zaporozhets (2017) focus on the uncertainty on legislator types in a legislature and the interaction of the legislature and a single lobbyist.

Wright (1996, p. 72-76) introduced the continuum of access model for lobbying, where lobbying starts with the 'positioning' stage, introducing themselves to legislators, before the exchange of information occurs in the 'messaging' stage. (Heberlig, 2005) ran a study on legislators approached by the American Federation of Labor and Congress of Industrial Organizations from 1954-1975 and found mixed results on Wright's continuum model.

More specifically, the lobbyists appeared to gather information on legislators first, with varied target legislators at the 'positioning' and 'messaging' stages. We incorporate the uncertainty on the legislator preferences in our model and focus on the transition from the 'positioning' to the 'messaging' stage - where the lobbyist secures the support of the legislator. As policies are often he model focuses on the binary setting.

We also include a measure of the legislator's level of integrity. As with Che and Gale (1998), the politician does not hold an open sale for his support given restrictions on vote-buying. Instead, the politician chooses the lobbyist that promises to contribute enough, and if there is more than one, the most to her campaign or projects. We can think about this from the perspective of a reputation conscious politician. A reputation conscious politician may not want to be associated with more than one lobbying group for an issue, and would like to be viewed as consistent and honest by her constituents. The more controversial an issue is, the more likely it is for the politician's threshold to be higher. Allying one's self to lobbyists for all issues may also look distasteful, so the politician only considers offers from lobbyist that is substantial enough for her to support. We call this lower limit the legislator's integrity threshold. The integrity threshold plays an important role in the model. The higher the threshold is, the harder it is for lobbyists to secure politician support without taking into account the position of the politician. For more honest politicians, the threshold is higher, as their votes are harder to secure. The threshold can be adjusted upwards or downwards depending on the bias of the politician on the issue at hand - hereon referred to as the bias adjusted threshold. Stronger politician bias for a particular policy outcome reduces the integrity threshold significantly for the corresponding lobbyist, and vice versa.

Public awareness on lobbying is centered largely on the perception of transactional lobbyist-legislator interactions. Media reports on lobbying scandals have highlighted the prevalence of cash-for favour exchanges despite the apparent lack of direct impact in policy outcomes. Politicians are less likely to seek rent where there is increased scrutiny. For example, the sectors with the highest levels of lobbying spending in the United States in the past five years do not include hot button issues such as abortion and gun laws (Center for Responsive Politics, 2017). Schneider (2012) found in his study on the role of the agenda-setter and lobbying found that for issues with low salience, committee chairs have more incentive to propose more extreme policies and reap monetary rewards. Low salience sectors, including finance and health care, have the highest levels of lobbyist spending for 2018 (Center for Responsive Politics, 2018). Business interests, trade associations, and professional groups have been shown to employ more lobbyists per issue and spend more (Baumgartner and Leech, 2001; de Figueiredo and Richter, 2013; McKay, 2012), accounting for 84% and 86% of total lobbying expenditures at the U.S. Federal and state level (de Figueiredo, 2004). The views of legislators are often undisclosed in these sectors, and this uncertainty in preferences provides politicians with opportunities for gain at the expense of the collective good. An article from the New York Times in 2013 reported that the influence of Wall Street in Washington has grown substantially (Lipton and Protess, 2013). In one of the bills passed by the House Financial Services committee in May 2013 exempting a large portion of financial trades in new regulation, the recommendations of Citigroup were reflected in seventy of the eighty five lines of the bill (Lipton and Protess, 2013). A better understanding of how lobbying proceeds may help in creating more effective regulations for the industry. The impact of lobbying activities from non-profit associations on legislation is significant enough for the US congress to attempt to legislate restrictions on their participation in lobbying in the mid-1990s (Balassiano and Chandler, 2010). Increased information on lobbying activities to the public, and the reflection of public sentiment by non-profit associations, may influence legislator preferences, and consequently the outcomes of the lobbying process to improve public welfare.

The rest of the paper is organized as follows. Section 2 introduces the model. Sections 3 and 4 show the expected utility and the computation of best responses. The equilibrium of the game is characterized in full in Section 5. The results are discussed in Section 6, and the paper is concluded in Section 7. The proofs are shown in full in the appendix.

2 The Model

There is a legislator with a policy bias b, distributed $b \sim U(-d, d)$ where $d \geq 0$, and an integrity threshold t. A positive b indicates a legislator bias towards policy two, a negative b indicates a preference for policy one, and at $b = 0$, the legislator is unbiased. The integrity threshold dictates how costly the support of the legislator can be. The effective integrity threshold, or the bias-adjusted threshold, changes depending on the bias of the legislator. An increase in legislator bias for a policy decreases the bias-adjusted integrity threshold, and vice versa.

The legislator's utility is given by,

$$U_L = \begin{cases} p_1 - t - b & if\ Lobbyist\ 1\ wins, \\ p_2 - t + b & if\ Lobbyist\ 2\ wins, \\ 0 & otherwise. \end{cases}$$

Two lobbyists supporting opposing policy positions try to sway the legislator. The lobbyists are aware of the distribution of the legislator's bias and know the integrity threshold. Both simultaneously bid $p_i \geq 0$ for the legislator's support. Bids are only considered by the legislator when they are above the bias-adjusted threshold. The bid that provides the legislator with the highest utility wins. Only the winning bid is collected. Lobbyist i gains $w \in \mathbb{R}_+$ upon winning.

The utilities of each lobbyist i are given below [1]:

$$U_1 = \begin{cases} w - p_1 & if\ p_1 > t + b\ and\ p_1 > p_2 + 2b, \\ 0 & otherwise. \end{cases}$$

$$U_2 = \begin{cases} w - p_2 & if\ p_2 > t - b\ and\ p_2 > p_1 - 2b, \\ 0 & otherwise. \end{cases}$$

The game is summarized in the simultaneous-move Bayesian game (N,P,b,u) defined formally as follows:

1. There are $N = \{1, 2\}$ lobbyists.
2. Lobbyists bid $p_i \in P_i = [0, w]$.
3. b is a realization of types for the legislator and is drawn from a uniform distribution $U(-d, d)$, where $d \in \mathbb{R}_{\geq 0}$.
4. $u = \{u_1, u_2\}$ where u_i is the utility function of lobbyist i.

A lobbyist only wins if the bid is considered sufficient and provides the most payoff to the

[1] Lobbyist i supports policy i.

legislator. The probabilities of winning for each lobbyist are:

$$P(1\ wins) = P(p_1 > t + b)\ and\ P(p_1 > p_2 + 2b)$$
$$P(2\ wins) = P(p_2 > t - b)\ and\ P(p_2 > p_1 - 2b)$$

We begin with looking at the probability of winning for lobbyist 1,

$$\begin{aligned} P(1\ wins) &= P(p_1 > t + b)\ and\ P(p_1 > p_2 + 2b) \\ &= P(b < p_1 - t\ \cap\ b < \frac{p_1 - p_2}{2}) \\ &= P(b < min\{p_1 - t, \frac{p_1 - p_2}{2}\}) \end{aligned}$$

The conditions above can be rewritten in terms of the average bids of the legislator. When $p_1 - t$ is greater than $(p_1 - p_2)/2$, the average bid is greater than the integrity of the legislator threshold, $((p_1 + p_2)/2 > t)$. Doing the same for lobbyist 2, the probabilities of winning are as follows:

$$P(1\ wins) = \begin{cases} P(b < p_1 - t) & if\ \frac{p_1+p_2}{2} < t, \\ P(b < \frac{p_1-p_2}{2}) & otherwise. \end{cases} \quad (1)$$

$$P(2\ wins) = \begin{cases} P(b > t - p_2) & if\ \frac{p_1+p_2}{2} < t, \\ P(b > \frac{p_1-p_2}{2}) & otherwise. \end{cases} \quad (2)$$

Note that as the bias of the legislator is uniformly distributed, the winning probability functions are continuous. When the average bid is equal to the integrity threshold, $P(b < p_1 - t) = P(b < (p_1 - p_2)/2)$, and $P(b > t - p_2) = P(b > (p_1 - p_2)/2)$. We can rewrite the winning probabilities from (1) and (2) as follows:

$$P(1\ wins) = \begin{cases} \frac{p_1-t+d}{2d} & if\ \frac{p_1+p_2}{2} \leq t, \\ \frac{p_1-p_2+2d}{4d} & if\ \frac{p_1+p_2}{2} \geq t. \end{cases} \quad (3)$$

$$P(2\ wins) = \begin{cases} \frac{d-t+p_2}{2d} & if\ \frac{p_1+p_2}{2} \leq t, \\ \frac{2d-p_1+p_2}{4d} & if\ \frac{p_1+p_2}{2} \geq t. \end{cases} \tag{4}$$

3 Expected Utilities

The expected utility of lobbyist i is given by the probability of winning [3 and 4] and the utility of the lobbyist, U_i. As with the probabilities, the computation of the expected utility depends on the relationship of the average bid to the integrity threshold of the legislator. We explore the expected utility of the lobbyists under two scenarios: one with the average bid below the threshold ($(p_1 + p_2)/2 \leq t$) and, another with the average bid above the threshold ($(p_1 + p_2)/2 \geq t$). The expected utility is continuous at the point where the average bid is equal to the threshold ($(p_1 + p_2)/2 = t$). For each of the two scenarios, the bids that maximize the expected utility of the lobbyist is identified. The optimal bids when the average bid is below and above the threshold is referred to as $\underline{p_i}$ and $\overline{p_i}$, respectively.

We begin with lobbyist 1. The expected utility of lobbyist 1 is as follows:

$$EU_1(p_1, p_2) = \begin{cases} \frac{p_1-t+d}{2d}(w - p_1) & if\ \frac{p_1+p_2}{2} \leq t \quad (1), \\ \frac{p_1-p_2+2d}{4d}(w - p_1) & if\ \frac{p_1+p_2}{2} \geq t \quad (2). \end{cases} \tag{5}$$

Scenario 1: Average bid below the threshold ($\frac{p_1+p_2}{2} \leq t$)

Given an opposing bid p_2, we solve for the maximum of the expected utility (5.1). We equate the first derivative $(w - d - 2p_1 + t)/2d$ to 0 and find $p_1 = (w + t - d)/2$. Note that the function (5.1) is concave, with a second derivative, $-1/d$, that is always negative. In order to remain under the threshold, the lobbyist only considers $p_1 \in [t - d, 2t - p_2)$ given p_2.

The identification of $\underline{p_1}$ is shown graphically in figures 1 and 2. We find that $\underline{p_1} = (w + t - d)/2$ is only valid when $(w + t - d)/2 < 2t - p_2$. Otherwise, $\underline{p_1} = 2t - p_2$. Rearranging to find the p_2 conditions for each $\underline{p_1}$, we have:

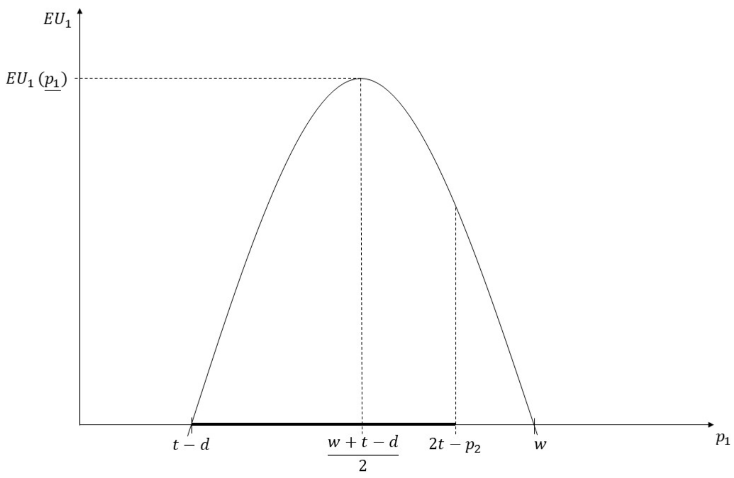


Figure 1: $\frac{w+t-d}{2} \leq 2t - p_2$

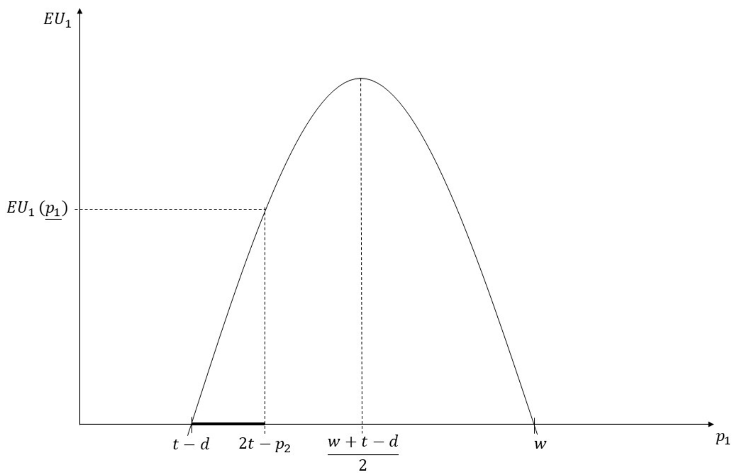


Figure 2: $\frac{w+t-d}{2} \geq 2t - p_2$

$$\underline{p_1} = \begin{cases} \frac{w+t-d}{2} & if\ \ p_2 \leq \frac{3t-w+d}{2}, \\ 2t - p_2 & otherwise. \end{cases} \tag{6}$$

From this, we obtain the expected utility of lobbyist one when he bids to keep the average bid below the threshold under $\underline{p_1}$:

$$EU_{1,\underline{p_1}}(p_2) = \begin{cases} \frac{(d-t+w)^2}{8d} & if\ \ p_2 \leq \frac{3t-w+d}{2}, \\ \frac{(d-p_2+t)(p_2-2t+w)}{2d} & otherwise. \end{cases} \tag{7}$$

The lower bound, $t - d$, is the minimum possible bid for the lobbyist. One can look at the lower bound as the lowest possible bias adjusted threshold — the legislator's integrity threshold, t, adjusted to account for the maximum possible bias the legislator can have for the lobbyist $-d$. As the legislator only considers bids that are at least the bias adjusted threshold, bidding below the lower bound renders lobbyist 1's bid ineligible.

We assume that the winning valuation, w, always exceeds the minimum possible bid for the lobbyists. If the lower bound is higher than the expected winning valuation, then no lobbyist can bid and the game does not proceed. The lobbyist's maximum possible bid is his winning valuation. If the lobbyist decides to bid below the lower bound $t - d$, the expected utility becomes negative. Note that the interval endpoints do not intersect as long as $p_2 < t + d$. [2]

Scenario 2: Average bid above the threshold

Given an opposing bid p_2, we solve for the maximum of the expected utility (5.2). From the first derivative, $(-2d - 2p_1 + p_2 + w)/4d$, we obtain the critical point $p_1 = (w + p_2 - 2d)/2$. The function (5.2) is always concave with a negative second derivative $-1/2d$, therefore, the maximum bid for the function is given by $p_1 = (w + p_2 - 2d)/2$. For the average bid to be greater than or equal to the threshold, for any given p_2, lobbyist one has to bid at least $2t - p_2$ and chooses from $p_1 \in [max\{p_2 - 2d, 2t - p_2\}, w]$.

[2]When $p_2 \geq t + d$, lobbyist one does not choose to keep the average below the threshold. All feasible bids will neither reach the threshold nor beat the opposing bid, and lobbyist 2 wins definitively if lobbyist 1 bids to keep the average bid below the threshold.

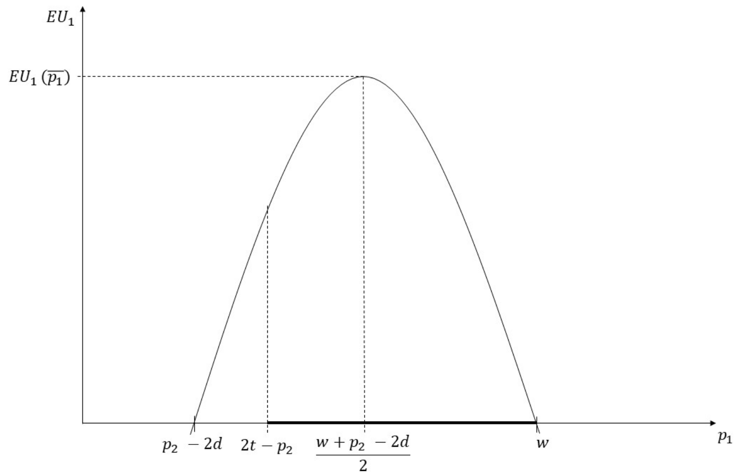


Figure 3: $\frac{w+p_2-2d}{2} \geq 2t - p_2$

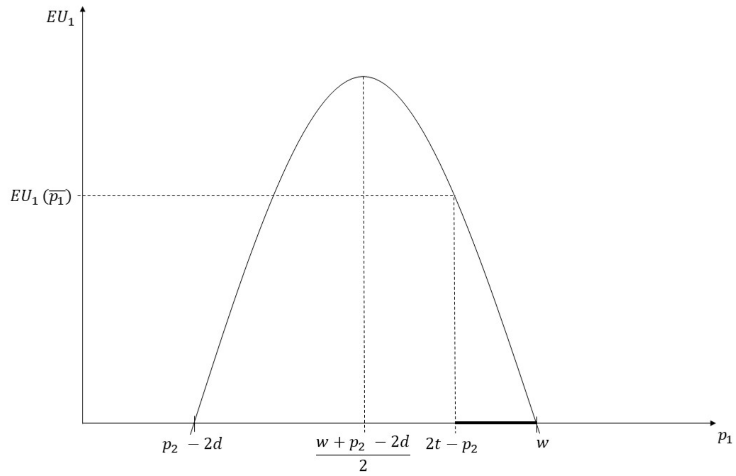


Figure 4: $\frac{w+p_2-2d}{2} < 2t - p_2$

The identification of $\overline{p_1}$ is shown graphically in figures 3 and 4. We obtain the expected utility of lobbyist one when he bids to push the average bid above the threshold under $\overline{p_1}$:

$$EU_{1,\overline{p_1}}(p_2) = \begin{cases} \frac{(2d-p_2+w)^2}{16d} & if \;\; p_2 \geq \frac{4t+2d-w}{3}, \\ \frac{(d-p_2+t)(p_2-2t+w)}{2d} & otherwise. \end{cases} \tag{8}$$

Under this scenario, the lobbyist must bid at least $p_2 - 2d$ for the expected utility to be positive. When the average bid is above or equal to the threshold, it is certain that one of the lobbyists wins the support of the legislator. The lobbyist shifts from making sure that the minimum eligibility condition, the bias adjusted threshold, is met to ensuring that his bid is competitive enough to remain in the game. If both lobbyist bids exceed their respective bias adjusted thresholds, lobbyist one only wins once his bid, adjusted with the bias, exceeds that of his opponent (*i.e.* $p_1 - b > p_2 + b$). Recall that a negative bias is advantageous for lobbyist 1, obtaining the maximum possible advantage when $b = -d$. For lobbyist 1 to have an eligible bid when the average bid is above or equal to the threshold, the bid must at least be greater than $p_2 - 2d$. The bid is capped by the winning valuation w.

Note that the optimal bids $\underline{p_1}$ and $\overline{p_1}$ change depending on where p_2 in relation to $(3t - w + d)/2$ and $(4t + 2d - w)/3$, respectively. As the minimum possible bid cannot exceed the winning valuation, $t - d \leq w$, $(3t - w + d)/2$ is always less than or equal to $(4t + 2d - w)/3$. The two threshold points, $(3t - w + d)/2$ and $(4t - w + 2d)/3$ are referred to as lower bound and upper bound, respectively.

4 Determination of Best Responses

The lobbyist compares the expected utility he gets from bidding $\underline{p_1}$ and $\overline{p_1}$ for a given p_2, and chooses the bid that provides him with the highest utility. The best response of lobbyist i is derived as follows:

$$BR_i(p_{-i}) = \begin{cases} \frac{w+t-d}{2} & if \;\; p_{-i} \leq \frac{3t-w+d}{2}, \\ 2t - p_{-i} & if \;\; \frac{3t-w+d}{2} \leq p_{-i} \leq \frac{2d+4t-w}{3}, \\ \frac{w-2d+p_{-i}}{2} & otherwise. \end{cases} \tag{9}$$

We show the derivation of best responses for lobbyist 1 when the opposing bid is less than or equal to the lower bound $((3t - w + d)/2)$, greater than or equal to the upper bound $(4t - w + 2d)/3$, and between the lower and upper bounds.

Case 1: $p_2 \leq \frac{3t-w+d}{2}$

When the opposing bid is less than or equal to the lower bound ($p_2 \leq (3t - w + d)/2$), lobbyist 1 can choose to bid $\underline{p_1} = (w + t - d)/2$ and keep the average bid below the threshold, or bid $\overline{p_1} = 2t - p_2$ and push the average to the threshold. The expected utilities for each possible bid are compared below:

$$\begin{aligned}
EU_1(\underline{p_1}) &= EU_1(\overline{p_1}) \\
\frac{(d-t+w)^2}{8d} &= \frac{(d-p_2+t)(p_2-2t+w)}{2d} \\
d^2+9t^2+w^2+6dt-2dw-6tw &= 4p_2(3t-w+d)-4p_2^2 \\
(3t-w+d)^2 &= 4p_2(3t-w+d)-4p_2^2 \\
(2p_2-(3t-w+d))^2 &= 0 \\
p_2 &= \frac{3t-w+d}{2} \qquad (10)
\end{aligned}$$

The expected utility for $\underline{p_1}$ is always higher than that of $\overline{p_1}$ when p_2 is not equal to the lower bound. The best response of lobbyist 1 when the opposing bid is below the lower bound is to keep the average bid below the threshold and bid $\underline{p_1} = (w+t-d)/2$.

When the opponent bid is sufficiently low, the lobbyist chooses to bid conservatively. Increasing the bid increases the probability of winning but decrease the take home win. As his opponent is not bidding aggressively, the lobbyist may end up paying more if he decides to bid just enough to ensure that the game ends, $p_1 = 2t - p_2$. The increase in the probability of winning is not enough to cover by the loss from the increase in bid. Bidding conservatively, a lobbyist chooses to bid midway between his minimum possible bid $t-d$, and his maximum possible bid w, maximising his expected utility. The lobbyist can afford to bid conservatively as the probability of the opposing lobbyist winning is not high enough to warrant a price war. Note that this is reflected in the best response $(w+t-d)/2$, which is constant and does not change with p_2.

$$BR_1(p_2) = \frac{w+t-d}{2}, \ when \ p_2 \leq \frac{3t-w+d}{2}$$

Case 2: $\frac{3t-w+d}{2} < p_2 < \frac{4t+2d-w}{3}$

For a given p_2 between the lower and upper bounds ($(3t-w+d)/2 < p_2 < (4t+2d-w)/3$), lobbyist 1 bids $2t-p_2$, as $\underline{p_1} = \overline{p_1} = 2t - p_2$, and their corresponding expected utilities equal.

When the opposing bid is between the lower and upper bounds, the average bid is always equal to the threshold. The lobbyist, as with the previous cases, is faced with a tradeoff between a higher chance of winning and a lower winning payoff. When the opposing bid is not low enough for the lobbyist to focus primarily on his eligibility as in Case 1, but not high enough for the lobbyist to bid aggressively, the lobbyist best responds by bidding just enough to ensure that the game ends with a winning bid.

$$BR_1(p_2) = 2t - p_2, \ \ when \ \frac{3t - w + d}{2} \leq p_2 \leq \frac{4t + 2d - w}{3}$$

Case 3: $p_2 \geq \frac{4t+2d-w}{3}$

If the opposing bid is greater than or equal to the upper bound ($p_2 \geq (4t + 2d - w)/3$), lobbyist one can choose to bid $\underline{p_1} = 2t - p_2$ and keep the average bid at the threshold, or bid $\overline{p_1} = (w + p_2 - 2d)/2$ and push the bid above the threshold. The expected utilities for the possible bids are compared below:

$$\begin{aligned}
EU_1(\underline{p_1}) &= EU_1(\overline{p_1}) \\
\frac{(d - p_2 + t)(p_2 - 2t + w)}{2d} &= \frac{(2d - p_2 + w)^2}{16d} \\
-(4t + 2d - w)^2 &= -6p_2(4t + 2d - w) + 9p_2^2 \\
0 &= (3p_2 - (4t + 2d - w))^2 \\
p_2 &= \frac{4t + 2d - w}{3}
\end{aligned} \tag{11}$$

The expected utility for $\overline{p_1}$ is always higher than that of $\underline{p_1}$ when p_2 is not equal to the upper bound. The best response of lobbyist 1 when p_2 greater than or ewaul to the upper bound is to keep the average bid above the threshold and bid $\overline{p_1} = (w + p_2 - 2d)/2$.

When the opponent bids aggressively, the lobbyist needs to at least match his opponent's bias adjusted bid. The lobbyist can choose to bid conservatively, and bid just enough to ensure that the game ends or match the opposing bid head on. Both $\underline{p_1}$ and $\overline{p_1}$ change with p_2, with $\overline{p_1}$ increasing and $\underline{p_1}$ decreasing alongside p_2. The more aggressive the opposing lobbyist bids, the more likely he is to win the support of the legislator. The lobbyist must then increase his bid in order to have a shot at winning the support of the legislator.

This cannot be true when the lobbyist chooses $\underline{p_1}$. By bidding conservatively, the lobbyist becomes less likely to win the support of the lobbyist but offsets this by increasing the take home pay through reducing the bid. The higher the p_2 gets, the less likely it is for the conservative bid to be eligible. The lobbyist needs to find a balance between the probability of winning and the cost of the legislator's support. He does this by choosing to bid aggressively. the lobbyist begins with considering the minimum competitive bid, $p_2 - 2d$, and the maximum possible bid w, deciding to settle on a bid betwwen the two values. In choosing $\overline{p_1}$, the lobbyist secures a significant chance of winning the legislator's support and enough utility once the support is won.

$$BR_1(p_2) = \frac{w + p_2 - 2d}{2}, \ when \ p_2 \geq \frac{4t + 2d - w}{3}$$

From the best responses identified in the three cases above, we find the set of best responses for lobbyist 1. Doing the same for lobbyist 2, we find the general best response function for lobbyist i below:

$$BR_i(p_{-i}) = \begin{cases} \frac{w+t-d}{2} & if \ p_{-i} \leq \frac{3t-w+d}{2}, \\ 2t - p_{-i} & if \ \frac{3t-w+d}{2} < p_{-i} < \frac{4t+2d-w}{3}, \\ \frac{w-2d+p_{-i}}{2} & otherwise. \end{cases} \tag{12}$$

5 Equilibrium

Let $BR_i(p_{-i}) \subset P_i$ be the set of player is best response bids against $p_{-i} \in P_{-i}$. The Nash Equilibrium is formally defined as follows:

Definition. *Nash Equilibrium*

$$p^* = (p_1^*, p_2^*) \in P \text{ is a Nash Equilibrium if } p_i^* \in BR_i(p_{-i}^*) \text{ for every } i \in N$$

The Nash Equilibrium from the best responses in (12) is shown in full under Proposition 1 and summarized in Figure 5.

Proposition 1. Nash Equilibria

1. If $d \geq w - t$, there exists a unique nash equilibrium (p_i^*, p_{-i}^*) where for all $i = \{1, 2\}$,

$p_i^* = p_{-i}^* = \frac{w+t-d}{2}$.

2. If $\frac{5}{7}(w-t) < d < w-t$, there exists only two nash equilibria (p_1^*, p_2^*) where,
   - $p_1^* = \frac{w+t-d}{2}$ and $p_2^* = \frac{3t-w+d}{2}$ or,
   - $p_1^* = \frac{3t-w+d}{2}$ and $p_2^* = \frac{w+t-d}{2}$
3. If $d = \frac{5}{7}(w-t)$, there exist only three nash equilibria (p_1^*, p_2^*) where,
   - $p_1^* = \frac{3w-5d+t}{4}$ and $p_2^* = \frac{w+t-d}{2}$ or,
   - $p_1^* = \frac{w+t-d}{2}$ and $p_2^* = \frac{3w-5d+t}{4}$ or,
   - $p_1^* = p_2^* = t$.
4. If $\frac{1}{2}(w-t) < d < \frac{5}{7}(w-t)$, there exists only two nash equilibria $(p_1^*, p_2^*)$where,
   - $p_1^* = \frac{w-2d+2t}{3}$ and $p_2^* = \frac{4t-w+2d}{3}$ or,
   - $p_1^* = \frac{4t-w+2d}{3}$ and $p_2^* = \frac{w-2d+2t}{3}$
5. If $d \leq \frac{1}{2}(w-t)$, there exists a unique nash equilibrium (p_i^*, p_{-i}^*) where for all $i = \{1,2\}$, $p_i^* = p_{-i}^* = w - 2d$.

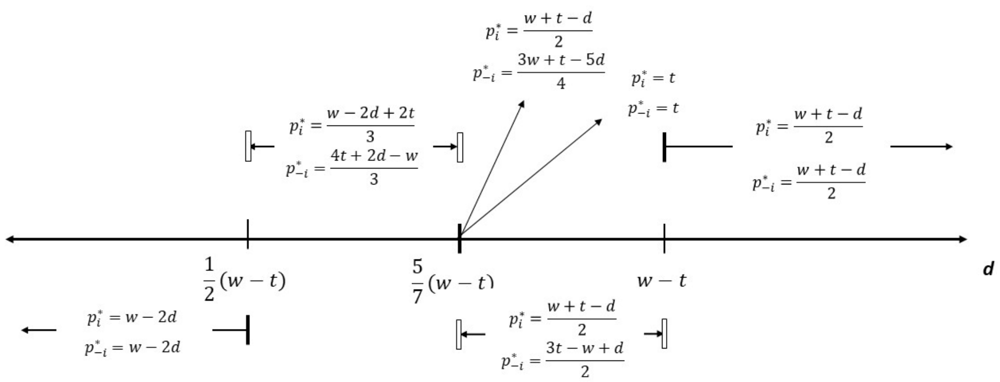


Figure 5: Equilibrium - One Shot Game

6 Results and Discussion

The above equilibria is obtained by checking for mutual best responses of lobbyists 1 and 2. We show the full calculation of equilibria in Appendix A. We look at the equilibria based on the relationship of the length of the bias interval to the winning valuation w and the legislator's integrity threshold t. The results from Proposition 1 are discussed point by point in this section.

Let us begin with point 1: When $d \geq w - t$, both lobbyists bid $(p_i^*, p_{-i}^*) = (w + t - d)/2, (w+t-d)/2)$ and keep the average bid below the legislator's bias integrity threshold, $(p_1^* + p_2^*)/2 \leq t$. When the length of the bias interval is long enough ($d \geq w - t$), both lobbyists maximize their expected utilities by bidding conservatively — keeping the average bid below the threshold. The length of the bias interval, $2d$, measures the uncertainty of the legislator bias. A longer bias interval indicates more uncertainty on the legislator bias. The best case scenario for a lobbyist would be to have the threshold adjusted heavily downwards by a favorable bias. Conversely, the worst possible case for the lobbyist would be if the bias is at its most favorable for the opposing lobbyist, as this drives the bias adjusted threshold above the winning valuation, making it impossible to win. Both lobbyists are unaware of the actual legislator bias, but have the same information on its distribution. As it is equally likely for both of them to be at an advantageous position, but too costly for either one to secure a high enough probability of winning, both lobbyists bid conservatively. The bids, and consequently the utilities of lobbyists under this scenario do not depend on their opponents bid, and both lobbyists are equally likely to win the legislator's support. The lobbyist chooses to bid midway between his minimum possible bid $t - d$, and his maximum possible bid w, maximising his expected utility.

The uncertainty of the legislator bias has to be sufficiently higher than the difference between the lobbyist's winning valuation and the legislator's integrity threshold for the equilibrium bids to be valid. Without uncertainty, the minimum qualifying bid is just the integrity threshold of the legislator. An increase in the level of integrity of the legislator, holding the winning valuation constant, makes it more likely the bias interval to be sufficiently high. This may help explain why despite high levels of coverage on single issues in the United States (*e.g.* gun rights vs. gun control and pro-life vs. pro-choice), and the small degree of uncertainty on legislator preference on the issues, often earmarked by party memberships (*e.g.* Republicans for gun rights and Democrats for gun control), lobbyist spending in the single issue sector does not reach the top five sectors with the highest lobbying expenditure in 2018 (Center for Responsive Politics, 2018). Single issues also come with high legislator integrity thresholds. The positions of legislators are heavily publicised, with high costs on reputation if the legislator's integrity is questioned. With ideological issues, the rewards of the policy are often not as high as issues tied with industry interest. Lower winning valuations coupled with the the high integrity threshold can drive lobbyists to bid more conservatively.

Moving on to point 2: When $(5/7)(w-t) < d < w-t$, both lobbyists bid (p_i^*, p_{-i}^*) where $p_i^* = (w+t-d)/2$ and $p_{-i}^* = (3t-w+d)/2$, for all $i = \{1, 2\}$, just enough for the average bid to reach the legislator's bias integrity threshold, $(p_1^* + p_2^*)/2 = t$. When the interval is moderately long ($(5/7)(w-t) < d < w-t$), lobbyists can always bid aggressively to secure the win — however the increase in the winning probability must be worth the increased cost. As the uncertainty on the legislator is still significant when the bias interval is moderately long, bidding aggressively causes the lobbyist to pay more than necessary to win the legislator's support. The lobbyist is better off bidding conservatively. The remaining lobbyist bids just enough to have him indifferent between bidding conservatively and aggressively, keeping the average bid at the threshold.

Point 3 finds only two equilibria when $d = (5/7)(w-t)$. Lobbyists can choose to either bid similarly to when the bid is moderately long, $(p_i^*, p_{-i}^*) = ((8t-w)/7, (6t+w)/7)$, or bid the legislator threshold, $(p_i^*, p_{-i}^*) = (t, t)$, for all $i = \{1, 2\}$. When lobbyists bid the legislator's integrity threshold, the legislator always chooses his policy of preferrence. The integrity threshold of the legislator covers not only the personal ideologies of the legislator but also takes into account the preference of the constituency and the severity of the reputational cost of being perceived dishonest. By bidding only the threshold, the winning lobbyist obtains the legislator's support in the policy making process, and the legislator does not have to compromise his beliefs. Recall that in this paper, we look at lobbyist vying for the support of a legislator. Although a legislator who already prefers a specific policy will most likely vote for it when the issue is on the floor, winning the support of the legislator would allow the lobbyist to access other legislators who may be critical to the policy and increase informational transactions to ease the approval process. For the constituents, the uncertainty on the legislator bias at $d = \frac{5}{7}(w-t)$ provides them with a clear view of whether their interests are best represented by their elected legislators.

In point 4, a unique equilibrium is identified when $(1/2)(w-t) < d < (5/7)(w-t)$. Both lobbyists bid (p_i^*, p_{-i}^*) where $p_i^* = (w-2d+2t)/3$ and $p_{-i}^* = (4t-w+2d)/3$, for all $i = \{1, 2\}$, just enough for the average bid to reach the legislator's bias integrity threshold, $(p_1^* + p_2^*)/2 = t$. With a bias interval that is moderately short $((1/2)(w - t) < d < (5/7)(w - t))$, bidding conservatively is risky as the interval is not long enough to ensure that the opponent does the same. One lobbyist tries and bids aggressively to increase the chance of securing the legislator's support, while the other bids just enough for the average bid to reach the threshold.

If the bias interval is neither sufficiently long nor short (*i.e.* $w - t \leq d \leq (w - t)/2$), we find some interesting results. With the exception of $d = (5/7)(w - t)$, the lobbyists do not arrive at a symmetric equilibrium.

Lastly, for point 5: when $d \leq \frac{w-t}{2}$, lobbyists bid $(p_i^*, p_{-i}^*) = (w - 2d, w - 2d)$ to push the average bid above the legislator's bias integrity threshold, $(p_1^* + p_2^*)/2 \geq t$. Both lobbyist tend towards bidding aggressively, pushing the average bid beyond the threshold, as the information on the bias becomes more precise. A short bias interval implies that the benefit of having the legislator preference is marginal. The winning bid needs to surpass both the threshold and the opposing bid. As the difference between the legislator's threshold and bias adjused threshold is minimal under a short bias interval, the lobbyists both assume that the opposing bid has already surpassed the threshold. As the bids are the same, lobbyists are equally likely to win the legislator's support. Notice that the equilibrium bid is the just the difference between the wealth valuation and the full length of the bias interval $2d$.

Another way to view above is that if the uncertainty of the legislator bias is sufficiently small relative to the difference between the lobbyist's winning valuation and the legislator's integrity threshold, the lobbyists bid aggressively. A higher winning valuation makes the uncertainty of the legislator preference smaller in comparison. Similary, a lower legislator integrity threshold decreases the condition $(w - t)/2$, making it more likely for the uncertainty of the legislator to reach the condition. Center for Responsive Politics (2018) reports that the top three sectors in terms of lobbying expenditure are Health, Finance, Miscellaneous Business at over \$500 million for each sector in 2018. All of these sectors provide very high payoffs for the lobbyists. Alongside this, as the public is less likely to have awareness on legislator positions on industry specific areas, the integrity threshold is significantly lower than those in hot button issues. The reputation of legislators are less likely to be questioned if lobbying requests are entertained for thesese issues. Although the lobbyists may have less certainty in terms of the legislator preference, this is dwarfed by the substantial winning valuation and the lower integrity threshold. This echoes results from existing literature that find business interests, trade associations, and professional groups as groups with the highest level of lobbying expenditure (Baumgartner and Leech, 2001; de Figueiredo, 2004; McKay, 2012; de Figueiredo and Richter, 2013).

7 Conclusion

We approach the lobbying process as a cash-for-favour exchange. A simultaneous lobbying structure is used to capture how lobbying proceeds behind closed doors. Under shadow lobbying, where lobbyist- legislator interactions are kept private, lobbyists may not be able to counter offer. The paper focuses on lobbyist interactions over one non-strategic legislator and explores the impact of uncertainty on lobbyist behaviour in isolation.

The model explains how the relationship between the uncertainty on the bias of the legislator, the legislator's integrity threshold, and the lobbyist's winning valuation affect lobbyist behaviour. When the uncertainty is sufficiently low with respect to the winning valuation, lobbyists tend to bid aggressively to try and secure the support of the legislator. When the uncertainty is sufficiently high, lobbyists bid conservatively in case the legislator has a strong preference for their policy. Otherwise, the lobbyists bid just enough to ensure that one lobbyist secures the legislator's support. We also find that there exists an interval length that allows us to observe the true preferences of the legislator despite choosing a lobbyist to support at a bid equal to her integrity threshold.

The interactions above provide a snapshot on how lobbying may proceed behind closed doors. The paper provides insights the public can use to assess legislator behaviour during the lobbying process. Results above imply that issues with high monetary reward, lobbyists bid more aggressively. These are also often issues where consituent ideologies are not as clear cut. Political agents, however, may listen to constituent opinions and adjust their preference intervals accordingly, which may ultimately affect which lobbyist she supports.

The model can be extended in future work to study outcomes for interactions under asymmetric cases. Politicians often take advantage of uncertainty to gain excess rent. Empirical studies on lobbying that include uncertainty of legislator positions may prove valuable in the formulation of policy recommendations.

References

Ansolabehere, S., de Figueiredo, J. M., and Snyder, J. M. (2003). Why is there so little money in u.s. politics? *The Journal of Economic Perspectives*, 17(1):105–130.

Austen-Smith, D. (1993). Information and influence: Lobbying for agendas and votes. *American Journal of Political Science*, 37(3):799–833.

Austen-Smith, D. and Wright, J. R. (1992). Competitive lobbying for a legislator's vote. *Social Choice and Welfare*, 9(3):229–257.

Balassiano, K. and Chandler, S. M. (2010). The emerging role of nonprofit associations in advocacy and public policy: Trends, issues, and prospects. *Nonprofit and Voluntary Sector Quarterly*, 39(5):946–955.

Baumgartner, F. R. and Leech, B. L. (2001). Interest niches and policy bandwagons: Patterns of interest group involvement in national politics. *The Journal of Politics*, 63(4):1191–1213.

Blanes i Vidal, J., Draca, M., and Fons-Rosen, C. (2012). Revolving door lobbyists. *American Economic Review*, 102(7):3731–3748.

Buzard, K. and Saiegh, S. (2016). Lobbying and legislative uncertainty. Unpublished manuscript, Syracuse University, NY, USA.

Center for Responsive Politics (2017). Ranked sectors. Online; accessed February 2018.

Center for Responsive Politics (2018). Lobbying database. Online; accessed July 2018.

Che, Y.-K. and Gale, I. L. (1998). Caps on political lobbying. *The American Economic Review*, 88(3):643–651.

de Figueiredo, J. M. (2002). Lobbying and information in politics. *Business and Politics*, 4(2):125129.

de Figueiredo, J. M. (2004). The timing, intensity, and composition of interest group lobbying: An analysis of structural policy windows in the states. Working Paper 10588, National Bureau of Economic Research.

de Figueiredo, J. M. and Richter, B. K. (2013). Advancing the empirical research on lobbying. Working Paper 19698, National Bureau of Economic Research.

Dekel, E., Jackson, M. O., and Wolinsky, A. (2006). Vote buying i: legislatures and lobbying. Discussion paper, Center for Mathematical Studies in Economics and Management Science.

Groseclose, T. and Snyder, J. M. (1996). Buying supermajorities. *American Political Science Review*, 90(2):303315.

Grossman, G. and Helpman, E. (1994). Electoral competition and special interest politics. Working Paper 4877, National Bureau of Economic Research.

Hall, R. L. and Deardorff, A. V. (2006). Lobbying as legislative subsidy. *American Political Science Review*, 100(1):6984.

Heberlig, E. S. (2005). Getting to know you and getting your vote: Lobbyists' uncertainty and the contacting of legislators. *Political Research Quarterly*, 58(3):511–520.

LaPira, T. M. and Thomas, H. F. (2014). Revolving door lobbyists and interest representation. *Interest Groups & Advocacy*, 3(1):4–29.

Lazarus, J., McKay, A., and Herbel, L. (2016). Who walks through the revolving door? examining the lobbying activity of former members of congress. *Interest Groups & Advocacy*, 5(1):82–100.

Lipton, E. and Protess, B. (2013). Banks lobbyists help in drafting financial bills.

McKay, A. (2012). Buying policy? the effects of lobbyists resources on their policy success. *Political Research Quarterly*, 65(4):908–923.

Milyo, J., Primo, D., and Groseclose, T. (2000). Corporate pac campaign contributions in perspective. *Business and Politics*, 2(01):75–88.

Schneider, M. T. (2012). Who writes the bill? the role of the agenda-setter in legislative lobbying. *SSRN*. Available Online: http://dx.doi.org/10.2139/ssrn.1612812 or https://ssrn.com/abstract=1612812.

Tyutin, A. and Zaporozhets, V. (2017). On Legislative Lobbying under Political Uncertainty. TSE Working Papers 17-807, Toulouse School of Economics (TSE).

Wright, J. (1996). *Interest Groups and Congress: Lobbying, Contributions, and Influence*. New topics in politics. Allyn and Bacon.

A Computation of Nash Equilibria

The determination of nash equilibria starts with fixing one lobbyist's bid to be either below the lower bound, between the two bounds, or above the upper bound. We begin with looking at the best responses of lobbyist 1 given p_2. We then proceed to check if lobbyist 2's best response to lobbyist 1's best response matches the initial p_2 to determine if a nash equilibrium exists.

Case 1: $p_2 \leq \frac{3t-w+d}{2}$

When lobbyist 2 bids below the lower bound, the best response of lobbyist 1 is

$$BR_1(p_2) = \frac{w+t-d}{2} \tag{13}$$

Let $p_1^* = \frac{w+t-d}{2}$. An equilibria exists if the best response of lobbyist 2 to p_1^* is below the lower bound. We proceed to solve for equilibria depending on where p_1^* is with respect to the lower bound and the upper bound below.

Case 1.1: $p_1^* \leq \frac{3t-w+d}{2}$

We begin with checking the conditions where p_1^* is below the lower bound,

$$\begin{aligned} p_1^* &\leq \frac{3t-w+d}{2} \qquad (14) \\ \frac{w+t-d}{2} &\leq \frac{3t-w+d}{2} \\ w+t-d &\leq 3t-w+d \\ w-t &\leq d \qquad (15) \end{aligned}$$

If $d \geq w-t$ and $p_1^* = \frac{w+t-d}{2}$ (See Eq. 13), the best response of the second lobbyist is given as follows:

$$BR_2(p_1^*) = \frac{w+t-d}{2}$$

Let $p_2^* = \frac{w+t-d}{2}$. If $d \geq w - t$, p_2^* is also below the lower bound, making p_1^* a valid best response. As p_1^* and p_2^* are mutual best response when $d \geq w - t$, $p_1^* = p_2^* = \frac{w+t-d}{2}$ are equilibrium bids when $d \geq w - t$.

If $d \geq w - t$, the expected utilities of lobbyists under $(p_1^*, p_2^*) = \frac{w+t-d}{2}$ are as follows:

$$EU_1(p_1^*, p_2^*) = \frac{(d-t+w)^2}{8d}$$
$$EU_2(p_1^*, p_2^*) = \frac{(d-t+w)^2}{8d}$$

Case 1.2: $\frac{3t-w+d}{2} < p_1^* < \frac{4t+2d-w}{3}$

From (14) and (15), we know that $p_1^* > \frac{3t-w+d}{2}$ if $d < w - t$. To correctly identify the set of d values where p_1^* is between the lower and upper bound, we check the conditions where $p_1^* < \frac{4t+2d-w}{3}$:

$$p_1^* < \frac{4t+2d-w}{3} \tag{16}$$
$$\frac{w+t-d}{2} < \frac{4t+2d-w}{3}$$
$$d > \frac{5}{7}(w-t) \tag{17}$$

Therefore, when $\frac{5}{7}(w-t) < d < w - t$, p_1^* is between the lower and the upper bound. If p_1^* is between the lower and the upper bound, the best response of lobbyist of the second lobbyist is given as follows:

$$BR_2(p_1^*) = 2t - (\frac{w+t-d}{2})$$
$$= \frac{3t-w+d}{2}$$

Recall that the lower bound is always less than the upper bound for all permissible values of w, d, and t. If $p_2^* = \frac{3t-w+d}{2}$, lobbyist 1 best responds with $\frac{w+t-d}{2}$. As p_1^* and p_2^* are mutual best responses when $\frac{5}{7}(w-t) < d < w - t$, $p_1^* = \frac{w+t-d}{2}$ and $p_2^* = \frac{3t-w+d}{2}$ are equilibrium bids if $\frac{5}{7}(w-t) < d < w - t$.

When $\frac{5}{7}(w-t) < d < w-t$, at $p_1^* = \frac{w+t-d}{2}$ $p_2^* = \frac{3t-w+d}{2}$ the expected utilities of both lobbyists are the same with those from Case 1.1,

$$EU_1(p_1^*, p_2^*) = \frac{(d-t+w)^2}{8d}$$
$$EU_2(p_1^*, p_2^*) = \frac{(3w-3t-d)(3d+t-w)}{8d}$$

Case 1.3: $p_1^* \geq \frac{4t+2d-w}{3}$

From (17), we know that when $d \geq \frac{5}{7}(w-t)$, p_1^* from (13) is greater than the upper bound. If $p_1^* \geq \frac{4t+2d-w}{3}$,

$$BR_2(p_1) = \frac{w-2d+p_1}{2}$$
$$BR_2(p_1^*) = \frac{w-2d+\frac{w+t-d}{2}}{2}$$
$$= \frac{3w-5d+t}{4}$$

Let $p_2^* = \frac{3w-5d+t}{4}$. Obtaining the conditions where $\frac{3w-5d+t}{4}$ is less than or equal to the lower bound below,

$$\frac{3w-5d+t}{4} \leq \frac{3t-w+d}{2}$$
$$3w-5d+t \leq 6t-2w+2d$$
$$d \geq \frac{5}{7}(w-t) \tag{18}$$

As $p_2^* \leq \frac{3t-w+d}{2}$ only when $d \geq \frac{5}{7}(w-t)$, and $p_1^* \geq \frac{4t+2d-w}{3}$ only when $d \leq \frac{5}{7}(w-t)$, both p_1^* and p_2^* occur only when $d = \frac{5}{7}(w-t)$. An equilibrium $p_1^* = \frac{w+t-d}{2}$ and $p_2^* = \frac{3w-5d+t}{4}$ exists if $d = \frac{5}{7}(w-t)$.

At $d = \frac{5}{7}(w-t)$, $p_1^* = \frac{6t+w}{7}$ and $p_2* = \frac{8t-w}{7}$. The bid of lobbyist 1 always exceeds that of lobbyist 2 if the threshold is below the winning valuation. The expected utilities of each lobbyist at $d = \frac{5}{7}(w-t)$ given p_1^* and p_2^* are given below:

$$EU_1(p_1^*, p_2^*) = \frac{18(w-t)}{35}$$
$$EU_2(p_1^*, p_2^*) = \frac{16(w-t)}{35}$$

Now, we look at the best response of lobbyist 1 when lobbyist 2 bids between the lower and upper bounds.

Case 2: $\frac{3t-w+d}{2} < p_2 < \frac{4t+2d-w}{3}$

When the bid of lobbyist 2 is between the lower and upper bounds:

$$BR_1(p_2) = 2t - p_2 \tag{19}$$
$$p_1^* = 2t - p_2$$

Let $p_1^* = 2t - p_2$. We proceed with checking for equilibria, determining the sets of values where $\frac{3t-w+d}{2} < BR_2(p_1^*) < \frac{4t+2d-w}{3}$.

Case 2.1: $p_1^* \leq \frac{3t-w+d}{2}$

If p_1^* is below the lower bound, the best response of lobbyist 2 from (9) is $BR_2(p_1^*) = \frac{w+t-d}{2}$.

Let $p_2^* = BR_2(p_1^*)$. Substituting p_2^* as lobbyist 2's bid in p_1^*, $p_1^* = \frac{3t-w+d}{2}$. From (15) and (17), we know that p_2^* is between the lower and upper bounds if $\frac{5}{7}(w-t) < d < w-t$. As p_1^* does not exceed the lower bound, the equilibrium $p_1^* = \frac{3t-w+d}{2}$ and $p_2^* = \frac{w+t-d}{2}$ exists if $\frac{5}{7}(w-t) < d < w-t$ (See Case 1.2).

If $\frac{5}{7}(w-t) < d < w-t$, the expected utilities of lobbyists under $(p_1^*, p_2^*) = (\frac{3t-w+d}{2}, \frac{w+t-d}{2})$ are as follows:

$$EU_1(p_1^*, p_2^*) = \frac{(3w-3t-d)(3d+t-w)}{8d}$$
$$EU_2(p_1^*, p_2^*) = \frac{(d-t+w)^2}{8d}$$

Case 2.2: $\frac{3t-w+d}{2} < p_1^* < \frac{4t+2d-w}{3}$

If p_1^* is between the lower and upper bounds, lobbyist 2 best responds with $BR_2(p_1) = 2t - p_1$.

Rearranging the inequality conditions for p_1^*, we find the set of p_2 conditions consistent with p_1^*.

$$\begin{aligned}
\frac{3t-w+d}{2} &< p_1^* < \frac{4t+2d-w}{3} \\
\frac{3t-w+d}{2} &< BR_1(p_2) < \frac{4t+2d-w}{3} \\
2t - \frac{4t+2d-w}{3} &< 2t - BR_1(p_2) < 2t - \frac{3t-w+d}{2} \\
\frac{w-2d+2t}{3} &< p_2 < \frac{w+t-d}{2}
\end{aligned} \tag{20}$$

Recall that p_2 is between the lower and upper bounds. In order for p_2 to also satisfy (20), we check if the relevant end points of (20) is within the lower and upper bounds (*i.e.* lower bound: $\frac{3t-w+d}{2} \leq \frac{w-2d+2t}{3}$ and upper bound: $\frac{4t+2d-w}{3} \geq \frac{w+t-d}{2}$)

$$\begin{aligned}
\frac{w-2d+2t}{3} &\geq \frac{3t-w+d}{2} \\
2w - 4d + 4t &\geq 9t - 3w + 3d \\
\frac{5}{7}(w-t) &\geq d
\end{aligned}$$

$$\begin{aligned}
\frac{w+t-d}{2} &\leq \frac{4t+2d-w}{3} \\
3w + 3t - 3d &\leq 8t + 4d - 2w \\
\frac{5}{7}(w-t) &\leq d
\end{aligned}$$

However, we find that this is only true when the conditions intersect at $d = \frac{5}{7}(w-t)$, where $p_1^* = p_2^* = t$. To determine if $p_1^* = p_2^* = t$ are equilibrium be, we verify if p_1^* and p_2^* are in the interval $(\frac{3t-w+d}{2}, \frac{4t+2d-w}{3})$ when $d = \frac{5}{7}(w-t)$:

Lower Bound at $d = \frac{5}{7}(w-t)$

$$\frac{3t-w+d}{2} = t - \frac{w}{7}$$

Upper Bound at $d = \frac{5}{7}(w-t)$

$$\frac{4t+2d-w}{3} = \frac{6t+w}{7}$$

As the winning valuation is always greater than or equal to the legislator's integrity threshold, $t - \frac{w}{7} < t < \frac{6t+w}{7}$, $p_1^* = p_2^* = t$ is an equilibrium at $d = \frac{5}{7}(w-t)$. and $w \neq t$. The expected utilities in both cases of (5) provide the lobbyist with the same value.

At $d = \frac{5}{7}(w-t)$, the expected utilities of lobbyists under $(p_1^*, p_2^*) = (t, t)$ are as follows:

$$\begin{aligned} EU_1(p_1^*, p_2^*) &= \frac{w-t}{2} \\ EU_2(p_1^*, p_2^*) &= \frac{w-t}{2} \end{aligned}$$

Case 2.3: $p_1^* \geq \frac{4t+2d-w}{3}$

If p_1^* is above the upper bound, lobbyist 2 best responds with,

$$\begin{aligned} BR_2(p_1^*) &= \frac{w-d+p_1^*}{2} \\ p_2 &= \frac{w-2d+2t-p_2}{2} \\ p_2 &= \frac{w-2d+2t}{3} \end{aligned} \tag{21}$$

Let $p_2^* = \frac{w-2d+2t}{3}$, substituting this to (19),

$$\begin{aligned} p_1^* &= 2t - \frac{w-2d+2t}{3} \\ &= \frac{4t-w+2d}{3} \end{aligned}$$

From below, we find that p_2^* is between the lower and upper bounds when $\frac{w-t}{2} < d < \frac{5}{7}(w-t)$:

$$\begin{aligned}\frac{w-2d+2t}{3} &< \frac{3t-w+d}{2}\\ 2w-4d+4t &< 9t-3w+3d\\ \frac{5}{7}(w-t) &< d\end{aligned} \tag{22}$$

$$\begin{aligned}\frac{w-2d+2t}{3} &< \frac{4t+2d-w}{3}\\ 3w+6t-6d &< 12t+6d-3w\\ \frac{1}{2}(w-t) &\leq d\end{aligned} \tag{23}$$

As $p_1^* \geq \frac{4t+2d-w}{3}$, we find that $p_1^* = \frac{4t-w+2d}{3}$, $p_2^* = \frac{w-2d+2t}{3}$ is an equilibrium when $\frac{w-t}{2} < d < \frac{5}{7}(w-t)$.

If $\frac{w-t}{2} < d < \frac{5}{7}(w-t)$, the expected utilities of lobbyists under $(p_1^*, p_2^*) = (\frac{4t-w+2d}{3}, \frac{w-2d+2t}{3})$ are as follows:

$$\begin{aligned}EU_1(p_1^*, p_2^*) &= \frac{(2w-2t-d)(5d+t-w)}{9d}\\ EU_2(p_1^*, p_2^*) &= \frac{(d-t+w)^2}{9d}\end{aligned}$$

Lastly, we determine the best response of lobbyist 1 when $p_2 \geq \frac{4t+2d-w}{3}$.

Case 3: $p_2 \geq \frac{4t+2d-w}{3}$

When p_2 is above the upper bound, the best response of lobbyist 1 is given below:

$$BR_1(p_2) = \frac{w-2d+p_2}{2} \tag{24}$$

Let $p_1^* = \frac{w-2d+p_2}{2}$. To check for equilibria, we find the sets of values where $BR_2(p_1)^* \geq \frac{4t+2d-w}{3}$.

Case 3.1: $p_1^* \leq \frac{3t-w+d}{2}$

If p_1^* is below the lower bound, the best response of lobbyist 2 is given by $BR_2(p_1^*) = \frac{w+t-d}{2}$.

Let $p_2^* = \frac{w+t-d}{2}$. Substituting this to (24), $p_1^* = \frac{3w-5d+t}{4}$. p_1^* is less than or equal to the lower bound when $d \geq \frac{5}{7}(w-t)$ (see Eq. 18). For p_2^* to be greater than or equal to the upper bound, $d \leq \frac{5}{7}(w-t)$ (16) and (17).

Similar to Case 1.3, these conditions only intersect when $d = \frac{5}{7}(w-t)$. An equilibrium $p_1^* = \frac{3w-5d+t}{4}$ and $p_2^* = \frac{w+t-d}{2}$ exists if $d = \frac{5}{7}(w-t)$.

At $d = \frac{5}{7}(w-t)$, $p_1^* = \frac{8t-w}{7}$ and $p_2 * = \frac{6t+w}{7}$, the expected utility of each lobbyist is given below:

$$
\begin{aligned}
EU_1(p_1^*, p_2^*) &= \frac{16(w-t)}{35} \\
EU_2(p_1^*, p_2^*) &= \frac{18(w-t)}{35}
\end{aligned}
$$

Case 3.2: $\frac{3t-w+d}{2} < p_1^* < \frac{4t+2d-w}{3}$

If p_1^* is between the lower and upper bounds, the best response of lobbyist 2 is given by $BR_2(p_1) = 2t - p_1$.

Let $p_2^* = 2t - p_1$. Solving for $BR_1(p_2^*)$,

$$
\begin{aligned}
BR_1(p_2^*) &= \frac{w-2d+2t-p_1}{2} \\
3p_1 &= w - 2d + 2t \\
p_1 &= \frac{w-2d+2t}{3}
\end{aligned}
$$

Substituting $p_1^* = \frac{w-2d+2t}{3}$ to p_2^*,

$$\begin{aligned} p_2^* &= 2t - \frac{w - 2d + 2t}{3} \\ &= \frac{4t + 2d - w}{3} \end{aligned}$$

From (22) and (23), we know that $\frac{3t-w+d}{2} < p_1 < \frac{4t+2d-w}{3}$, when $\frac{w-t}{2} < d < \frac{5}{7}(w-t)$. As p_2^* is at least the upperbound, we find that $p_1^* = \frac{w-2d+2t}{3}$, $p_2^* = \frac{4t+2d-w}{3}$ is an equilibrium when $\frac{w-t}{2} < d < \frac{5}{7}(w-t)$.

As with Case 2.3, one lobbyist bids at the point where he is indifferent between bidding conservatively and aggressively (see Eq. 11), while another bids just enough to keep the average bid at the threshold when the bias interval is not short enough to bid aggressively.

If $\frac{w-t}{2} < d < \frac{5}{7}(w-t)$, the expected utilities of lobbyists under $(p_1^*, p_2^*) = (\frac{w-2d+2t}{3}, \frac{4t-w+2d}{3})$ are as follows:

$$\begin{aligned} EU_1(p_1^*, p_2^*) &= \frac{(d-t+w)^2}{9d} \\ EU_2(p_1^*, p_2^*) &= \frac{(2w-2t-d)(5d+t-w)}{9d} \end{aligned}$$

Case 3.3: $p_1^* \geq \frac{4t+2d-w}{3}$

If p_1^* is above the upper bound, the best response of lobbyist 2 is $BR_2(p_1) = \frac{w-2d+p_1}{2}$. Let $p_2^* = \frac{w-2d+p_1}{2}$. Solving for $BR_1(p_2^*)$,

$$\begin{aligned} BR_1(p_2^*) &= \frac{w - 2d + \frac{w-2d+p_1}{2}}{2} \\ 4p_1 &= 2w - 4d + w - 2d + p_1 \\ 3p_1 &= 3w - 6d \\ p_1 &= w - 2d \end{aligned}$$

Substituting $p_1^* = w - 2d$ to p_2^*,

$$p_2^* = \frac{w - 2d + w - 2d}{2}$$
$$p_2^* = w - 2d$$

Note that $w - 2d \geq \frac{4t+2d-w}{3}$ when $d \leq \frac{w-t}{2}$. Therefore, $p_1^* = p_2^* = w - 2d$ is an equilibrium if $d \leq \frac{w-t}{2}$.

If $d \leq \frac{w-t}{2}$, the expected utilities of lobbyists under $(p_1^*, p_2^*) = (w - 2d, w - 2d)$ are as follows:

$$EU_1(p_1^*, p_2^*) = d$$
$$EU_2(p_1^*, p_2^*) = d$$

7 Summary of Conclusions

Overall, the body of work provides insights on the policy-making process. The first two papers discuss outcomes given competing incumbents aiming to maximize popularity, and the third paper looks at how lobbyists behave given uncertain legislator preferences.

The results of the first paper showed how a politician's private interests and the electorate control, in the form of popularity payoffs, affect policy outcomes. As private benefits increase, the propensity of politicians to be dishonest also increase. In terms of popularity payoffs, the results indicate that positive public response on correct policy choices will increase the incentive for politicians to be honest. However, one can only ensure the unique implementation of the popular choice when the issue is salient. When issues are non-salient and the payoffs from implementing a policy are sufficiently high, politicians can pool on a decision to appear jointly as effective agents. Furthermore, an increased requirement in decision-making of politicians will push towards the implementation of popular policies. The impact of re-election and the introduction of a distinction between socially optimal and popular choices will be interesting to explore as future extensions to the model.

The second paper looked at policy outcomes when politicians have the opportunity to pander. When the popular choice is unclear, pandering as a strategy disappears. However, when the popular choice is clear, both politicians pander in equilibrium. Without private information, increased certainty on the socially optimal state does not influence policy implementation. The outcomes depend largely on how salient the issues are and the intensity of median voter preference. Uncertainty in public perception leads to strategic divergence in positions by the politicians. Issue salience is an important factor in determining the type of policy outcome. Voters may be able to push politicians towards socially optimal choices if key conditions are met. The introduction of information asymmetry, and multiple issue platforms across one or two periods are interesting extensions of the current model.

The third paper explored how lobbyists bid for a legislator's support under uncertain legislator preferences. Under low levels of uncertainty, lobbyists tend to bid aggressively to try and secure the support of the legislator. However, when the uncertainty is sufficiently high, lobbyists bid conservatively as the legislator may have a strong preference for their policy. Otherwise, the lobbyists only bid enough to ensure one lobbyist wins the support of the legislator. The paper provides valuable insights that can be used to effectively engage with legislators throughout the lobbying process. olitical agents, however, may listen to constituent opinions and adjust their preference intervals accordingly, which may ultimately affect which lobbyist wins her support. The model can be extended further in future work to cover asymmetry in lobbying under uncertainty.

The work overall provides very useful insights on the policy making process. In analysing the decision-making process, politician accountability can be exacted not only after decisions are made. The effect of public opinion across different types of issues are explored and the receptiveness of politicians to external avenues of profit are studied across different issues. The papers contribute to existing literatures of political agency, pandering, public opinion, and lobbying. The results may aid in the development of avenues where constituents can effectively influence policy during the policy making-process and curb rent-seeking behaviour.